ar
AMPLIFIER
RESEARCH

Operating and Service Manual

MODEL

25S1G4A

PART NUMBER

1009507-501

SERIAL NUMBER

28945

AMPLIFIER RESEARCH
Souderton, PA 18964-9990 USA
TEL 215-723-8181 TWX 510-661-6094 FAX 215-723-5688

AMPLIFIER RESEARCH

160 School House Road, Souderton, PA 18964-9990 USA
TEL 215-723-8181 • FAX 215-723-5688

EC Declaration of Conformity

We; Amplifier Research
160 School House Road
Souderton, Pa. 18964

declare that as of 1997, our product(s);

the Model 25S1G4A series amplifiers

to which this declaration relates is in compliance with the requirements of the EEC EMC Directive (89/336/EEC) and Low Voltage Directive (73/23/EEC) in accordance with the relative standards listed below:

EMC:

EN 50082-2 : 1995
Electromagnetic compatibility - Generic immunity standard
Part 2: Industrial environment

EN 55011 : 1991
Electromagnetic emissions requirements for Industrial, Scientific and Medical (ISM) Equipment
Group 1, Class A

Safety:

IEC 1010-1 : 1990 + A1, A2

The CE marking is affixed on the device according to the EC Directives.

Donald R. Shepherd
President

⚠ INSTRUCTIONS FOR SAFE OPERATION

BEFORE APPLYING POWER

Review this manual and become familiar with all safety markings and instructions.

Verify that the equipment line voltage selection is compatible with the main power source.

Protection provided by the equipment may be impaired if used in a manner not specified by Amplifier Research.

INTENDED PURPOSES

This equipment is intended for general laboratory use in a wide variety of industrial and scientific applications. It is designed to be used in the process of generating, controlling, and measuring high levels of electromagnetic Radio Frequency (RF) energy. Therefore, the output of the amplifier must be connected to an appropriate load, such as an antenna or a field-generating device. It is the responsibility of the user to assure that the device is operated in a location which will control the radiated energy such that it will not cause injury and will not violate regulatory levels of electromagnetic interference.

HAZARDOUS RF VOLTAGES

The RF voltages on the center pin of the RF output connector can be hazardous. The RF output connector should be connected to a load before AC power is applied to the amplifier. Do not come into contact with the center pin of the RF output connector or accessories connected to it. Place the equipment in a non-operating condition before disconnecting or connecting the load to the RF output connector.

SAFETY GROUND

This equipment is provided with a protective earth terminal. The main power source to the equipment must supply an uninterrupted safety ground of sufficient size to the input wiring terminals, power cord, or supplied power cord set. The equipment **MUST NOT BE USED** if this protection is impaired.

PHYSICAL DAMAGE

The RF amplifier should not be operated if there is physical damage, missing hardware, or missing panels.

MAINTENANCE CAUTION

Adjustment, maintenance, or repair of the equipment must be performed only by qualified personnel. Hazardous energy may be present while protective covers are removed from the equipment even if disconnected from the power source. Contact may result in personal injury. Replacement fuses are required to be of specific type and current rating.

⚠ INSTRUCTIONS FOR SAFE OPERATION *(CONTINUED)*

SAFETY SYMBOLS

This symbol is marked on the equipment when it is necessary for the user to refer to the manual for important safety information. This symbol is indicated in the Table of Contents to assist in locating pertinent information.

Dangerous voltages are present. Use extreme care.

CAUTION: The caution symbol denotes a potential hazard. Attention must be given to the statement to prevent damage, destruction or harm.

Indicates protective earth terminal.

RANGE OF ENVIRONMENTAL CONDITIONS

This equipment is designed to be safe under the following environmental conditions:

Indoor use

Altitude up to 2000M

Temperature of 5°C to 40°C

Maximum relative humidity 80% for temperatures up to 31°C. Decreasing linearity to 50% at 40°C.

Mains supply voltage fluctuations not to exceed ± 10% of the nominal voltage or minimum and maximum autoranging values.

Pollution degree 2: Normally non-conductive with occasional condensation

While the equipment will not cause hazardous condition over this environmental range, performance may vary.

COOLING AIR

Care should be exercised not to block the cooling air inlets or outlets. Cooling air blockage can result in damage to the RF amplifier or intermittent shut-downs.

TABLE OF CONTENTS

SECTION I **GENERAL INFORMATION**

1.1 General Description 1-1
1.2 Power Supplies 1-1
1.3 Specifications 1-1

SECTION II **OPERATING INSTRUCTIONS**

2.1 ⚠ General Information 2-1
2.2 Amplifier Operation 2-2
2.2.1 Local Operation 2-3
2.2.2 Remote Operation 2-3

SECTION III **THEORY OF OPERATION**

3.1 Introduction 3-1
3.2 RF Amplifier Operation 3-1
3.2.1 A1 Variable Gain Amplifier 3-1
3.2.2 A3 Linearizer Control Circuit 3-1
3.2.3 A4 One (1)-watt Amplifier 3-2
3.2.4 A5 Bias Control Circuit 3-2
3.2.5 A6, Four (4)-Watt Amplifier 3-3
3.2.6 A7, A9–A12 Quadrature-Coupled Amplifiers 3-3
3.2.7 A8 Splitter 3-4
3.2.8 A13 Combiner 3-4
3.3 Power Supply Assembly 3-4
3.3.1 A14 Operate/Control Board 3-4
3.3.2 A15 Regulator/Control Board 3-5

SECTION IV **MAINTENANCE**

4.1 General Maintenance Information 4-1
4.2 ⚠ Disassembly Procedures 4-1
4.3 ⚠ Troubleshooting 4-2
4.3.1 "Power On" Indication Doesn't Display on Front Panel 4-3
4.3.2 Unit Cannot be Operated Remotely 4-3
4.3.3 Thermal Fault 4-4
4.3.4 Interlock Fault 4-4
4.3.5 Voltage Faults 4-5
4.3.6 Low or No Power Output (DC Tests) 4-6
4.3.7 Low or No Power Output (RF Tests) 4-7

TABLE OF CONTENTS *(CONTINUED)*

SECTION V **REPLACEABLE PARTS**

5.1 Introduction 5-1
5.2 Ordering Information 5-1
5.3 Non-Listed Parts 5-1
5.4 Circuit Designators 5-1
5.5 Manufacturers' Abbreviation Listing 5-2
5.6 Master List 5-2
5.7 Schematics and Bills of Material (BOMs) 5-2

APPENDIX A: STANDARD ABBREVIATIONS FOR MANUFACTURERS A-1

SECTION VI **RECOMMENDED SPARE PARTS**

6.1 Level of Maintenance 6-1

WARRANTIES: LIMITATION OF LIABILITY

LIST OF FIGURES

2-1 Model 25S1G4A Front Panel 2-2
2-2 Model 25S1G4A Rear Panel 2-2
4.3.7.1 Typical Gain Response: Model 25S1G4A Amplifier 4-8
4.3.7.2 Typical Response: Input A8—Front Panel RF Output 4-9
4.3.7.3 Typical Quad Amp Response 4-9
4.3.7.5 Typical Four-Way Splitter Insertion Loss 4-10
4.3.7.6 Typical Four-Way Combiner Insertion Loss 4-10
4.3.7.6a Typical Four-Way Combiner Return Loss: Combined Output Port 4-11
4.3.7.7 Typical Quad Amp Response 4-11
4.3.7.8 Typical A6 Four (4)-Watt Amplifier Response 4-12
4.3.7.9 Typical A4 One (1)-Watt Amplifier Response 4-12
4.3.7.10 Typical A1 Variable Gain Amplifier Response 4-13

LIST OF TABLES

2-1 IEEE-488 Device Address Selection 2-5
2-2 Remote Error Codes/Messages 2-6
2-3 RS-232 Connector Pin-Outs 2-6

SECTION I

GENERAL INFORMATION

1.1 General Description

The Model 25S1G4A is a self-contained, broadband microwave amplifier designed for laboratory applications where instantaneous bandwidth, high gain, and moderate power output are required. A **GAIN** control, which is conveniently located on the unit's front panel, can be used to decrease the amplifier's gain by 10 decibels (dB) or more. Solid state technology is used exclusively to offer significant advantages in reliability and cost. A Model 25S1G4A, used with a frequency-swept signal source, will provide 25 watts of swept power output from 0.8–4.2 gigahertz (GHz). Typical applications include antenna and component testing, wattmeter calibration, and electromagnetic interference (EMI) susceptibility testing, as well as usage as a driver for frequency multipliers and high-power amplifiers. The Model 25S1G4A can be operated locally by using the unit's front panel controls, or remotely by using the unit's IEEE-488 or RS-232 interface.

1.2 Power Supplies

The Model 25S1G4A contains switching power supplies. The input voltage range to the power supplies is 90–132 or 180–264 Volts Alternating Current (VAC), 50/60Hz, selected automatically. The operator does not have to switch or change anything on the Model 25S1G4A when changing the AC input voltage. AC power consumption is 500 watts nominal. A built-in circuit breaker provides primary AC circuit protection.

1.3 Specifications

Refer to the "Amplifier Research Data Sheet" on the following page for detailed specifications. All voltage measurements referenced in this manual are Direct Current (DC) unless stated otherwise.

AMPLIFIER RESEARCH
160 School House Road, Souderton, PA 18964-9990 USA
TEL 215-723-8181 • FAX 215-723-5688

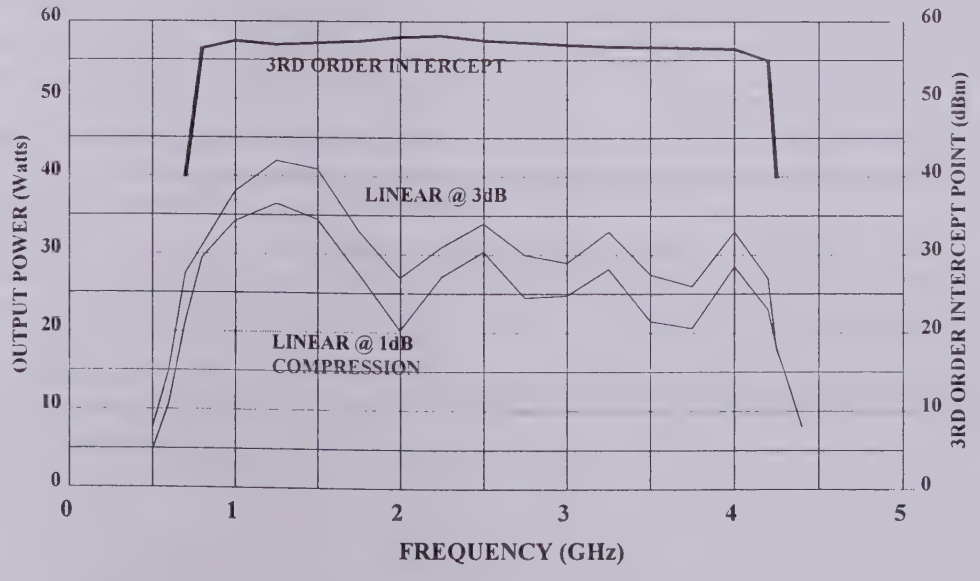
MODEL 25S1G4A
M1, M2, M3
25 WATTS CW
0.8 – 4.2 GHz

The Model 25S1G4A is a solid state, self-contained, air-cooled, broadband amplifier designed for applications where instantaneous bandwidth, high gain and linearity are required. Housed in a stylish contemporary cabinet, the unit is designed for benchtop use, but can be removed from the cabinet for immediate equipment rack mounting.

The 25S1G4A, when used with a sweep generator, will provide a minimum of 25 watts of RF power. Included is a front panel gain control which permits the operator to conveniently set the desired output level. The 25S1G4A is protected from RF input overdrive by an RF input leveling circuit which controls the RF input level to the RF amplifier first stage when the RF input level is increased above 0 dBm. The RF amplifier stages are protected from over-temperature by removing the DC voltage to them if an over-temperature condition occurs due to cooling blockage or fan failure. There is a digital display on the front panel to indicate the operate status and fault conditions if an over-temperature or power supply fault has occurred. The unit can be returned to operate when the condition has been cleared. The 25S1G4A digital panel provides control of all amplifier functions both locally and remotely via IEEE-488 (GPIB) or RS-232 interfaces.

The low level of spurious signals and linearity of the Model 25S1G4A make it ideal for use as a driver amplifier in testing wireless and communication components and subsystems. It can be used as a test instrument covering multiple frequency bands and is suitable for a variety of communication technologies such as CDMA, W-CDMA, TDMA, GSM etc. It is also suitable for EMC Test applications where undistorted modulation envelopes are desired.

25S1G4A
Typical Performance



REV101199

SPECIFICATIONS
Model 25S1G4A

RATED POWER OUTPUT ..... *25 watts minimum*

INPUT FOR RATED OUTPUT ..... *1.0 milliwatt*
..... *maximum*

POWER OUTPUT @ 3dB COMPRESSSION
Nominal ..... *32 watts*
Minimum ..... *25 watts*

POWER OUTPUT @ 1dB COMPRESSION
Nominal ..... *27 watts*
Minimum ..... *20 watts*

FLATNESS ..... *±1.5 dB typical*
..... *±2.0 dB maximum*

FREQUENCY RESPONSE ..... *0.8 – 4.2 GHz*
..... *instantaneously*

GAIN (at maximum setting) ..... *44 dB minimum*

GAIN ADJUSTMENT ..... *(Continuous Range)*
..... *10 dB minimum*
..... *(4096 steps remote)*

INPUT IMPEDANCE ..... *50 ohms*
..... *VSWR 2.0:1 maximum*

OUTPUT IMPEDANCE ..... *50 ohms, nominal*

MISMATCH TOLERANCE

100% of rated power without foldback. Will operate without damage or oscillation with any magnitude and phase of source and load impedance. (See Application Note #27)

MODULATION CAPABILITY

Will faithfully reproduce AM, FM, or pulse Modulation appearing on the input signal

THIRD ORDER INTERCEPT

See chart. The third order intercept points for this chart have been determined using two tones spaced 1 MHz apart. This is typical for W-CDMA systems. Closer tone spacing such as 60 kHz generally provides about a 1db to 3db improvement in the IP.

HARMONIC DISTORTION ..... *Minus 20 dbc*
..... *max at 20 watts*

SPURIOUS ..... *Minus 73 dbc Typ.*

PHASE LINEARITY ..... *± 1.0 deg/100 MHz, Typ*

PRIMARY POWER ..... *(Selected Automatically)*
..... *90-132, 180-264 VAC*
..... *50/60 Hz, single phase*
..... *600 watts maximum*

CONNECTORS
RF ..... *Type N female*
REMOTE INTERFACES
IEEE-488 ..... *24 pin male*
RS-232 ..... *9 pin Subminiature D (male)*

SAFETY INTERLOCK ..... *15 pin Subminiature D*

COOLING ..... *Forced air (self contained fans)*

MODEL CONFIGURATIONS

MODEL NUMBER	RF INPUT	RF OUTPUT	WEIGHT	SIZE (W x H x D)
25S1G4A	Type N female on front panel	Type N female on front panel	35.0 kg (77.0 lb)	50.3 x 20.3 x 54.6 cm 19.8 x 8.0 x 21.5 in
25S1G4AM1	Type N female on rear panel	Type N female on rear panel	35.0 kg (77.0 lb)	50.3 x 20.3 x 54.6 cm 19.8 x 8.0 x 21.5 in
25S1G4AM2	Same as 25S1G4A with enclosure removed for rack mounting		25.6 kg (57.0 lb)	48.3 x 17.8 x 54.6 cm 19.0 x 7.0 x 21.5 in
25S1G4AM3	Same as 25S1G4AM1 with enclosure removed for rack mounting		25.6 kg (57.0 lb)	48.3 x 17.8 x 54.6 cm 19.0 x 7.0 x 21.5 in

SECTION II

OPERATING INSTRUCTIONS

2.1 General Information

Operation of the Model 25S1G4A Broadband Microwave Amplifier is simple. The amplifier's input signal, whether swept or fixed in frequency, is fed into the jack marked **"INPUT,"** and the amplifier's output signal is taken from the jack labeled **"OUTPUT."** The unit is turned "ON" by activating the power switch. Fuses located in the AC input receptacle provide protection in the event of a unit malfunction. A polarized, three (3)-wire AC power cord is also included with the unit to provide cabinet and chassis grounding to the power mains.

⚠ **Caution:**

Operation of the Model 25S1G4A Amplifier is not critically affected by source and load Voltage Standing-Wave Ratio (VSWR), and the unit will remain unconditionally stable under any magnitude and phase conditions of source and load. The Model 25S1G4A has also been designed to withstand RF input power levels as high as 20mW—twenty (20) times its rated input power level of 1mW—without sustaining damage. However, RF input power levels greater than 20mW or transients with high peak voltages can damage the amplifier. Also, accidental connection of the Model 25S1G4A's output to its input can cause oscillations that will permanently damage the unit's input circuitry.

Important Note:

Although the Model 25S1G4A is designed to operate within the overdrive and load tolerance conditions described above, subjecting the amplifier to these conditions simultaneously can cause failure of the unit's output transistors. Repeated failures of this nature will not be covered under the unit's warranty.

The Model 25S1G4A Amplifier is protected from input overdrive by an Automatic Level Control (ALC) circuit that limits the maximum RF level to the first gain stage (Q1) of the RF Amplifier to approximately 0dBm.

The Model 25S1G4A's RF power transistors are protected from over-temperature by a sensor that senses the heat sink temperature near the RF output transistors. In the event of a cooling fan failure or an air flow blockage, the DC voltage will be removed from the RF stages; if and when the heat sink temperature reaches approximately 70°C, the vacuum fluorescent display (VFD) on the unit's front panel will indicate **THERMAL FAULT**. Normal operation can be resumed by resetting the amplifier after the heat sink temperature drops below 70°C.

2.2 AMPLIFIER OPERATION

Figure 2-1 shows the front panel of the Model 25S1G4A Broadband Microwave Amplifier.

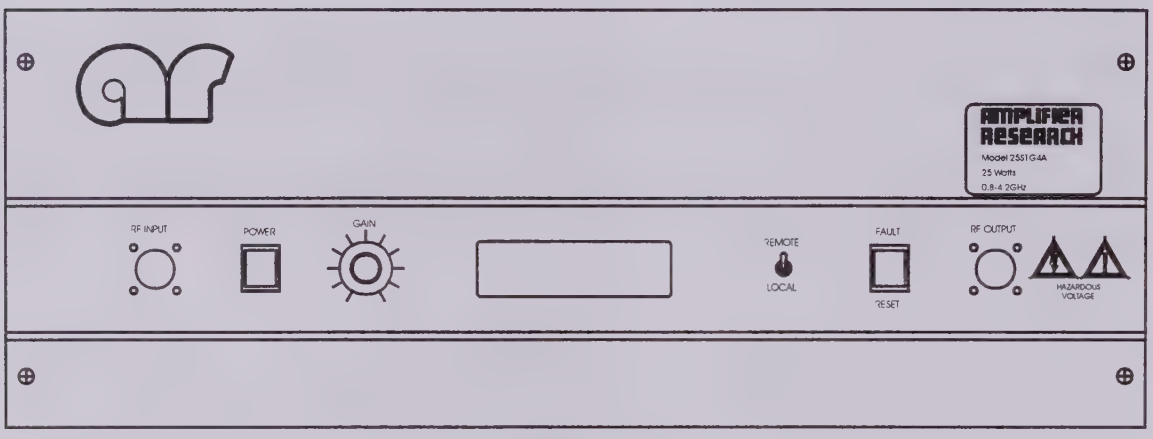


Figure 2-1
Model 25S1G4A Front Panel

Figure 2-2 shows the rear panel of the Model 25S1G4A Broadband Microwave Amplifier.

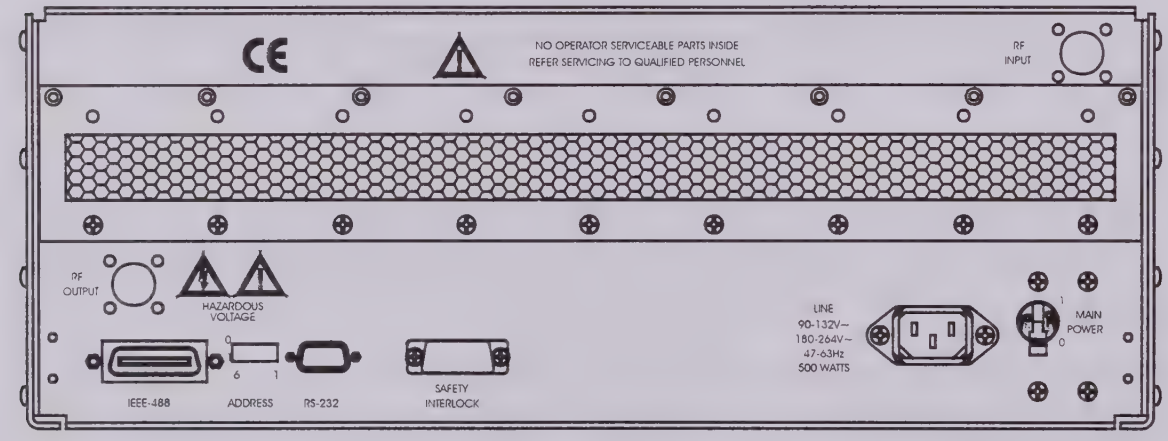


Figure 2-2
Model 25S1G4A Rear Panel

2.2 AMPLIFIER OPERATION *(CONTINUED)*

2.2.1 Local Operation

Power-up Sequence:

1. Connect the input signal to the unit's **RF INPUT** connector. **The input signal level should be 0dBm maximum.**

2. Connect the load to the unit's **RF OUTPUT** connector.

3. Set the **REMOTE/LOCAL** switch to **LOCAL**.

4. Check to see that the **MAIN POWER** switch (circuit breaker) on the unit's rear panel is set to the **1** ("on") position.

5. Press the **POWER** switch: the front panel vacuum fluorescent display (VFD) should read **POWER ON, STATUS OK** when power is applied.

   (NOTE: The amplifier changes state each time the POWER switch is depressed—if the unit is on when the POWER switch is depressed, it will turn off; if the unit is off when the POWER switch is depressed, it will turn on.)

6. Adjust the amplifier's gain by rotating the **GAIN** knob.

7. In the event of a fault, press the **FAULT/RESET** switch; if the fault does not clear, refer to subsection **4.3** ("Troubleshooting") of this manual.

2.2.2 Remote Operation

2.2.2.1 Introduction

This subsection describes remote operation of the Model 25S1G4A amplifier by utilizing either the IEEE-488 parallel interface or the RS-232 serial interface and a controlling device, such as a bus controller or a personal computer (PC).

2.2.2.2 Selecting Remote Operation

The Model 25S1G4A can be placed in the remote operation mode at any time by switching the **REMOTE/LOCAL** switch on the front panel to the **REMOTE** position. In this mode, control is transferred to the selected remote interface and all front panel controls are inoperative with the exception of the **REMOTE/LOCAL** switch. The amplifier's initial state will be **Power Off, Minimum Gain**. The front panel VFD will indicate **REMOTE** until the unit is returned to the local operation mode.

2.2 AMPLIFIER OPERATION *(CONTINUED)*

2.2.2 Remote Operation *(continued)*

2.2.2.3 Interface Selection

The Model 25S1G4A can be controlled via either the IEEE-488 or RS-232 interface; which interface is active is determined by the position of Switch 6 of the rear panel Dual In-Line Package (DIP) switch located between the two interface connectors. If Switch 6 is in the "on" (**1**) position, the RS-232 interface will be active; if Switch 6 is in the "off" (**0**) position, the IEEE-488 interface will be active.

2.2.2.4 Interface Set-up

Switches 1–5 of the rear panel DIP switch are used to select either the RS-232 communication (BAUD) rate or the IEEE-488 device address, depending upon which interface is active. (**Note:** These switches are only read at device power-up. In order for changes made in these switch settings to take place, AC power must be removed and then re-applied to the Model 25S1G4A.)

2.2.2.4.1 RS-232 BAUD rate selection

The serial communication (BAUD) rate can be set to five different levels. Selections are made by the positions of Switches 1–5 of the rear panel DIP switch. The following is a list of the available BAUD rates and the corresponding DIP switch positions:

BAUD Rate	**Switch On (1)**
1200	1 only
2400	2 only
9600	3 only
19,600	4 only
76,800	5 only

(**Note:** Any other combination of switch settings will result in a BAUD rate equal to 1200.)

2.2.2.4.2 IEEE-488 device address selection

The IEEE-488 device address can be set to any number between 1 and 30. This selection is made by setting Switches 1–5 of the rear panel DIP switch to the binary equivalent of the number. **Table 2-1** illustrates this switch selection.

2.2.2 Remote Operation *(continued)*

2.2.2.4 Interface Set-up *(continued)*

2.2.2.4.2 IEEE-488 device address selection *(continued)*

Table 2-1: IEEE-488 Device Address Selection

Device Address	Switch 5	Switch 4	Switch 3	Switch 2	Switch 1
1	off (0)	off (0)	off (0)	off (0)	on (1)
2	off (0)	off (0)	off (0)	on (1)	off (0)
3	off (0)	off (0)	off (0)	on (1)	on (1)
4	off (0)	off (0)	on (1)	off (0)	off (0)
5	off (0)	off (0)	on (1)	off (0)	on (1)
:					
:					
30	on (1)	on (1)	on (1)	on (1)	off (0)

2.2.2.5 Command Set Format

Each command is composed of one alpha character, up to four numeric parameters, and a command termination character. The command termination character is the "line feed" command, which is denoted and entered as <LF>. Commands are case-sensitive and must be entered in upper case only in order to be recognized.

2.2.2.6 IEEE-488 Communications

For IEEE-488 communications, the "End or Identify" (EOI) control line may also be used for command termination. When sending commands to the Model 25S1G4A via the IEEE-488 bus, terminate each command with a <LF>, an EOI, or both. No characters are permitted after the <LF> or EOI; the 25S1G4A interprets characters following the <LF> or EOI as the start of the next command. When an error condition is present at the Model 25S1G4A, the "Service Request" (SRQ) line is asserted; the operator can then perform a serial poll operation. The Model 25S1G4A error code (in binary) is contained in the returned serial poll status byte (STB). These error codes are defined in **Table 2-2**.

2.2.2 Remote Operation *(continued)*

2.2.2.6 IEEE-488 Communications *(continued)*

Table 2-2: Remote Error Codes/Messages

IEEE-488 Serial Poll Response (STB) (binary/decimal)	Model 25S1G4A Error Condition	RS-232 Error Message
(01000001) 65	BAD COMMAND	E1
(01000010) 66	BAD PARAMETER	E2
(01000011) 67	INTERLOCK FAULT	E3
(01000100) 68	THERMAL FAULT	E4
(01000101) 69	POSITIVE 15 VOLT FAULT	E5
(01000110) 70	POSITIVE 16 VOLT FAULT	E6
(01000111) 71	NEGATIVE 5 VOLT FAULT	E7
(01001000) 72	NEGATIVE 15 VOLT FAULT	E8
(01001001) 73	AMP FAULT	E9
**********	TRANSMISSION ERROR	E10

2.2.2.7 RS-232 Communications

If the RS-232 interface is active, the Model 25S1G4A will test for a properly connected RS-232 interface when it is switched into the remote operation mode. In order for the Model 25S1G4A to recognize an RS-232 connection, the "Data Carrier Detect" (DCD) line must be asserted. This line is sampled continuously to determine if the RS-232 connection is broken; therefore, it must remain asserted in order for the RS-232 interface to function. The "Clear To Send" (CTS) line is also used to gate information from the Model 25S1G4A. This line must be asserted in order to receive information from the Model 25S1G4A. The CTS line can be used as a "handshake" line to inform the Model 25S1G4A when it is permissible to send information. If the CTS line is de-asserted in the middle of a transmission, the character in the process of being transmitted will be completed and further transmission will halt until the CTS line is re-asserted. The Model 25S1G4A itself asserts two lines: "Data Terminal Ready" (DTR) and "Request To Send" (RTS). The DTR line is continuously asserted, while the RTS line is used to gate information into the Model 25S1G4A. Connector pin-out information is given in **Table 2-3**.

Table 2-3: RS-232 Connector Pin-Outs

Pin No.	Signal	Data Direction*	Description
1	DCD	<	Device Carrier Detect
2	RD	<	Receive Data
3	TD	>	Transmit Data
4	DTR	>	Data Terminal Ready
5	GND	N/A	Ground
6	NC	N/A	No Connection
7	RTS	>	Ready To Send
8	CTS	<	Clear To Send
9	NC	N/A	No Connection

***Note:**
> = Output from Model 25S1G4A
< = Input to Model 25S1G4A

2.2.2 Remote Operation *(continued)*

2.2.2.7 RS-232 Communications *(continued)*

Special Note: A null modem cable or adapter is required in order to properly interface the Model 25S1G4A to a standard serial port on a computer.

Once the RS-232 interface is established, commands are processed in the same manner as that of the IEEE-488 interface. The command structure is identical except that there is no EOI line. Therefore, all commands are terminated with a line feed (<LF>). Since this is a full-duplex asynchronous interface, if the Model 25S1G4A detects an error, the error message is immediately transmitted to the host controller. These error messages are defined in **Table 2-2.**

2.2.2.7.1 RS-232 port settings

The RS-232 port settings used for communication with the Model 25S1G4A are as follows.

Word Length: 8 bits

Stop Bits: 1

Baud Rate: 1200–76,800 (switch-selectable)

Parity: None

2.2.2.8 Remote Commands

The following commands are available to the user for remote communication and operation of the Model 25S1G4A. In the descriptions of these commands, a lower-case "x" is used to signify a numeric value or parameter.

2.2.2.8.1 Power On/Off

Controls the power on/off state of the Model 25S1G4A.

Syntax: Px

Parameters: 0 = power off

1 = power on

Example: To turn the power on, send the following command:

P1<LF>

2.2.2 Remote Operation *(continued)*

2.2.2.8 Remote Commands *(continued)*

2.2.2.8.2 Gain

Sets the remote gain level of the Model 25S1G4A with 4095 steps of resolution.

Syntax: Gxxxx

Parameters: 0000 = maximum gain

:

:

4095 = minimum gain

Example: To set the Model 25S1G4A to minimum gain, send the following command:

G4095<LF>

2.2.2.8.3 Reset

Resets the Model 25S1G4A, clearing all faults, if possible.

Syntax: R

Parameters: None

Example: To clear a fault, send the following command:

R<LF>

SECTION III

THEORY OF OPERATION

3.1 INTRODUCTION

The Model 25S1G4A Microwave Amplifier consists of a 0.8–4.2GHz RF Amplifier located on the heat sink and a Power Supply/Operate/Fault circuit mounted on a chassis assembly located opposite the heat sink. The RF Amplifier assembly can be accessed through the top of the unit, and the Power Supply and Operate/Fault circuits can be accessed through the bottom of the unit.

The RF Amplifier assembly consists of a Variable Gain Amplifier/Detector, a Linearizer/Control circuit, a one (1)-watt amplifier, a Bias Control circuit, a four (4)-watt Amplifier, a four-way splitter, four output Quadrature-Coupled Amplifiers ("Quad Amps"), and a four-way combiner.

The Power Supply section consists of an AC input filter, a circuit breaker, two switching power supplies, an Operate/Control circuit, and a Regulator/Fault circuit.

3.2 RF AMPLIFIER OPERATION

3.2.1 A1 Variable Gain Amplifier (Schematic No. 1008812—Part of Schematic No. 1008816)

The RF input signal is fed to the A1 Variable Gain Amplifier, RF Attenuator U1. U1 is a Gallium Arsenide (GaAs) Field-Effect Transistor (FET) Attenuator. DC signals between approximately -0.5V to -2.0V are used to control the shunt and series legs of the RF Attenuator. This Attenuator is used for manual gain control using the front panel **GAIN** control or for remote gain control, and to attenuate RF input signals above 0dBm, by utilizing internal voltages.

Inductor–Capacitor (LC) networks C2, L1, C3, and L2 form high-pass filters that are used to attenuate low-frequency signals.

Transistor Q1 is a GaAs FET and is the first stage of gain in the amplifier. Transistor A3Q1 in the A3 Linearizer Control Circuit controls the drain current through FET Q1. The output of Q1 is fed to the input of the Wilkinson Two-Way Splitter.

The Wilkinson Two-Way Splitter splits the signal into two paths: one output is fed to the input of the A4 One (1)-Watt Amplifier; the other output is fed to a detector that is terminated in 50Ω. The detected output is fed to the A3 Linearizer Control Circuit.

3.2.2 A3 Linearizer Control Circuit (Schematic No. 1007392—Part of Schematic No. 1008816)

Integrated circuit (IC) U1A provides a DC signal to the series element of the A1U1 Attenuator. The A1U1 Attenuator has minimum attenuation when the control signal is at approximately -12.5V, with maximum attenuation (minimum gain) occurring with 0V on the control input.

3.2 RF AMPLIFIER OPERATION *(CONTINUED)*

3.2.2 A3 Linearizer Control Circuit *(continued)*

NPN transistors Q2, Q3, and Q4 are used to provide break points in the series control voltage to the A1U1 RF Attenuator, thereby providing a more linear gain control/attenuation characteristic. IC U1B maintains the output impedance of the A1U1 RF attenuation near 50Ω. U1B is a comparator; a reference voltage is developed across a 56Ω resistor (R22) connected to the non-inverting input. The inverting input is connected to the output of the RF Attenuator A1U1 through A1L2. If the DC voltage at the output of the RF Attenuator becomes more negative, the output from the comparator will become more positive, thereby decreasing the output impedance of the A1U1 Attenuator and maintaining the correct output impedance.

PNP transistor Q1 is used to control the drain current of GaAs FET A1Q1 by varying the A1Q1 gate voltage. A reference voltage is provided at the base of Q1 by voltage dividers R25 and R26. The drain current of the RF FET (A1Q1) flows through R27 (220Ω, 1 watt). PNP transistor Q1 varies the gate voltage to the RF FET A1Q1 to maintain the correct drain current.

IC U2A amplifies the signal from the A1CR1 detector diode. IC U2B is a comparator; its normal output is approximately -12.5V. When the RF input signal to the A1 Variable Gain Amplifier is increased above approximately 1mW (0dBm), the voltage output from U2B will become less negative. This voltage is fed to the **GAIN** control on the front panel of the amplifier. The wiper of the **GAIN** control is connected to the control input of U1A of the Linearizer/Control Circuit. The amplifier has maximum gain at approximately -12.5V control input; minimum gain occurs at 0V. The attenuation of A1U1 will increase as the output of A3U2B varies from -12.5V toward 0V. This will help to protect the unit in the event of input overdrive.

3.2.3 A4 One (1)-Watt Amplifier (Schematic No. 1010591—Part of Schematic No. 1010749

The A4 One (1)-Watt Amplifier is assembled on a Teflon®/glass printed wiring board (PWB). It has three (3) GaAs FET gain stages; each stage is input and output DC isolated by coupling capacitors. Resistive feedback is used from the drain to the gate of the GaAs FET to decrease the low-frequency gain. Shunt capacitive stubs are used to tune the amplifier. The drain of Q4 is matched to the output using a tapered transformer.

The GaAs FETs are operated in a depletion mode. They will conduct the maximum DC current with 0V bias on their gates and are normally operated with approximately -1V to -4V on their gates.

3.2.4 A5 Bias Control Circuit (Schematic No. 1010902—Part of Schematic No. 1010749)

The Bias Control Circuit controls the DC drain current of the three (3) FET stages in the A4 One (1)-Watt Amplifier by varying the gate voltage of the RF stages. The Bias Control Circuit has a -5V input and a +16.5V input from the power supply.

All of the Bias Control Circuit stages operate in a similar manner; therefore, only the operation of the Q4 stage is described herein.

3.2 RF AMPLIFIER OPERATION *(CONTINUED)*

3.2.4 A5 Bias Control Circuit (Schematic No. 1010902—Part of Schematic No. 1010749) *(continued)*

PNP transistor Q4 (2N3906) is used to control the DC current through the A4Q3 FET in the A4 One (1)-Watt Amplifier. A reference voltage of 9.5V is established on the base of Q4 with the voltage divider network R7 (2.2K) and R12 (3.0K). There is a 18Ω resistor from the 16.5V line to the emitter of Q4 and also to the drain of A4Q3 in the A4 One (1)-Watt Amplifier. Q4 will operate normally with approximately 10.2V on the emitter; this will occur with approximately 370mA through the 18Ω resistor R8. If the current through A4Q3 decreases, the drop across R8 will decrease, thereby increasing the emitter voltage of Q4; this will cause Q4 to conduct more, which will cause the gate voltage of A4Q3 to become more positive, which will cause A4Q3 to conduct more, thereby returning the voltage at the emitter of Q4 to 10.2V.

3.2.5 A6 Driver Amplifier (Schematic No. 1009543)

The A6 Four (4)-Watt Amplifier is a single-stage GaAs FET amplifier. IC U1 is a voltage regulator set to +13.5V output, with the current limit at approximately 1.1 amps. Transistor Q1 turns off the voltage regulator U1 if the -5V input is below approximately -3.5V. Transistor Q2 senses the DC current through Q3 and maintains that current at 1 amp by varying the gate voltage of Q3. Q3 is a GaAs FET that is biased to a drain voltage of 10V and a drain current of 1 amp. U2 is a fixed attenuator that helps to improve the input VSWR of the stage and reduces the gain to approximately 4dB. Test Point TP1 can be used to check the DC operating point of Q3 without removing the unit's lid. The voltage on TP1 should be 10.9 ±0.4V when Q3 is operating normally without RF power output.

3.2.6 A7, A9, A10, A11, and A12 Quadrature-Coupled Amplifiers ("Quad Amps") (Schematic No. 1009163)

IC U1 is a voltage regulator set to 13.5V output with a current limit of approximately 2.2 amps. Q1 turns off the voltage regulator when the -5V supply voltage falls below approximately -3.5V. PNP transistors Q2 and Q5 regulate the DC current through Q3 and Q4, respectively, by sensing the voltage drop across 2.7Ω resistors R5 and R16 and varying the negative voltage on the gates of Q3 and Q4, thereby maintaining the drain current at approximately 1 amp. The DC operation of Q3 and Q4 can be checked on test points TP1 and TP2 without removing the unit's lid. The normal voltage on TP1 and TP2 without RF drive is 10.9 ±0.4V.

U2 and U3 are 90° quadrature couplers: U2 splits the input signal into two signals with a phase difference of 90°; U3 combines the RF outputs from Q3 and Q4 and is connected to the output connector J2. 50Ω termination resistors R17 and R18 absorb any difference signals and help to improve the input and output VSWR of the module. The module has a gain of 7.5dB or greater and delivers approximately 8 watts of RF power.

3.2 RF AMPLIFIER OPERATION *(CONTINUED)*

3.2.7 A8 Splitter

A8 is a multi-section, multi-stage, broadband Wilkinson splitter. Each input signal is split into four equal amplitude, in-phase signals. The amplitude of each output signal should be 6–7dB below the input signal when they are terminated in 50Ω.

3.2.8 A13 Combiner

A13 is a 4-way "T" combiner with impedance matching. The outputs of the A9, A10, A11, and A12 amplifiers are combined in A13 to yield a total power output approximately 6dB above the output of a single amplifier. The output of A13 is connected to the output connector of the Model 25S1G4A.

3.3 POWER SUPPLY ASSEMBLY (SCHEMATIC NO. 1009506)

The Power Supply Assembly consists of two switching power supplies: PS1 and PS2. These power supplies have a regulated output and auto-ranging on their inputs that automatically selects the correct connections for the line voltage in use, either 90–132 or 180–264VAC, 50/60Hz.

PS1 is a triple-output power supply that provides +5V, +12V, and -12V to power the Operate/Control Board. PS2 is also a triple-output power supply that provides +16.5V to the FET drain supplies in the One (1)-Watt, Four (4)-Watt, and Quadrature-Coupled amplifiers. PS2 also provides +24V and -24V power supplies. The +24V power supply powers the cooling fans; it is also regulated to +15V to operate the A3 Linearizer Control Board. The -24V power supply is regulated to -15V to operate the A3 Linearizer Control Board; it is also regulated to -5V to provide bias for the GaAs FETs in the One (1)-Watt, Four (4)-Watt, and Quadrature-Coupled amplifiers. Relay K1 switches the AC input power to PS2 for local and remote amplifier operation. Fans B1 and B2 supply air flow to cool the heat sink and the power supplies.

3.3.1 A14 Operate/Control Board (Schematic No. 1008597)

The A14 Operate/Control Board is a microcontroller-based printed wiring board (PWB) assembly that allows sensing and control of internal signals as well as remote personal computer (PC) control via on-board RS-232 and IEEE-488 data communications ports. The A14 Operate/Control Board utilizes a state-of-the-art, Reduced Instruction Set Computing (RISC) microcontroller that can quickly and reliably perform all front panel control and monitoring tasks, thereby allowing real-time control of the Model 25S1G4A via either remote bus. Besides being reported remotely, all amplifier faults are continuously monitored and indicated via the front panel VFD.

3.3 POWER SUPPLY ASSEMBLY (SCHEMATIC NO. 1009506) *(CONTINUED)*

3.3.2 A15 Regulator/Control Board (Schematic No. 1009511)

The A15 Regulator/Control Board is comprised of DC regulators, comparators, and relays.

3.3.2.1 Relays K1, K2, and K3 are energized by the A14 Operate/Control Board whenever the Model 25S1G4A is turned on, either locally or remotely. When energized, these relays supply DC power to ICs U1, U3, and U6 and Relay K1 in the Power Supply Assembly.

3.3.2.2 IC U1 supplies +15V to the A3 Linearizer Control Circuit. IC U6 supplies -15V to the A3 Linearizer Control Circuit. IC U3 supplies -5V to all of the Quad Amps, the A4 One (1)-Watt Amplifier, and the A6 Four (4)-Watt Amplifier.

SECTION IV

MAINTENANCE

4.1 General Maintenance Information

The Model 25S1G4A is a relatively simple instrument that should require very little maintenance. It is built with printed wiring boards (PWBs) and solid state components in order to ensure long, trouble-free life. However, should a malfunction occur, special care must be taken when servicing the unit in order to avoid damaging the solid state components or the PWBs.

Since the unit's solid state components are soldered in place, substitution of components should not be resorted to unless there is some indication that they are faulty. In addition, care must be taken when troubleshooting to avoid shorting amplifier voltages. Small bias changes may cause excessive dissipation or transients that could ruin the amplifier.

All components utilized in Amplifier Research instruments are conservatively operated to ensure maximum instrument reliability. Despite this, parts within an instrument may fail. In most cases, the instrument may be repaired immediately with a minimum of "down time." A systematic approach to troubleshooting can greatly simplify and thereby speed up the required repairs.

However, due to the critical importance of maintaining the amplifier's alignment, it is recommended that the unit be returned to the factory for part replacement and amplifier realignment whenever failure is caused by a breakdown of any of the components in the amplifier's RF signal circuits. Shipping instructions are as follows.

Please ship the unit **PREPAID** via United Parcel Service (UPS) to:

Amplifier Research Corporation

160 School House Road

Souderton, PA 18964-9990 USA

4.2 Disassembly Procedures

⚠ **Caution:**

Extreme caution should be utilized when troubleshooting this unit, particularly when measuring voltages in the power supply section, since hazardous voltages exist in the unit that could cause serious injury to any personnel performing the measurements.

The amplifier can be removed from its housing by removing four (4) screws from the front panel and four (4) screws from the back panel. The amplifier can then be slid from its housing. The top cover can be removed to gain access to the RF assemblies; the bottom cover can be removed to gain access to the power supplies.

4.3 TROUBLESHOOTING

⚠ CAUTION:

THE MICROWAVE TRANSISTORS USED IN THE MODEL 25S1G4A AMPLIFIER ARE GAAS FETS. THESE DEVICES ARE VERY RELIABLE WHEN INSTALLED IN A SUITABLE CIRCUIT, BUT THEY CAN BE EASILY DAMAGED BY IMPROPER TROUBLESHOOTING OR HANDLING TECHNIQUES. THE GATE JUNCTIONS OF THE GAAS FETS HAVE A HIGH INPUT IMPEDANCE AND ARE SUSCEPTIBLE TO STATIC DAMAGE OR DAMAGE DUE TO THE USE OF AN UNGROUNDED SOLDERING IRON. DO NOT TRY TO CHECK THE GAAS FETS WITH AN OHMMETER. USE CAUTION WHEN TROUBLESHOOTING THE GAAS FETS; DO NOT SHORT THE GATE TO THE GROUND OR TO THE DRAIN.

⚠ CAUTION:

USE CARE WHEN UNPACKING NEW GAAS FETS. THE GAAS FET PACKAGING SHOULD ONLY BE OPENED AT ELECTROSTATIC DISCHARGE (ESD)-APPROVED WORKSTATIONS, BY INDIVIDUALS WHO ARE FAMILIAR WITH THE HANDLING OF MICROWAVE GAAS FETS AND OTHER ESD-SENSITIVE DEVICES.

Troubleshooting the Model 25S1G4A in a logical manner can speed the solution to a problem. The settings of potentiometers ("pots"), capacitors ("caps"), or other variables should not be disturbed until other problems have been eliminated. Comparing the measured DC voltages to those shown on the schematics can solve many problems. Before measuring circuit voltages, first verify that the voltages to the circuits are correct.

Model 25S1G4A Troubleshooting Categories:

Subsection 4.3.1—**"Power On"** Indication Doesn't Display on Front Panel when **POWER** Switch is Depressed

Subsection 4.3.2—The Unit Cannot be Operated Remotely

Subsection 4.3.3—Thermal Fault

Subsection 4.3.4—Interlock Fault

Subsection 4.3.5—Voltage Faults

Subsection 4.3.6—Low or No Power Output (DC Tests)

Subsection 4.3.7—Low or No Power Output (RF Tests)

4.3 TROUBLESHOOTING *(CONTINUED)*

4.3.1 "Power On" Indication Doesn't Display on Front Panel when POWER Switch is Depressed (Schematic No. 1009506)

4.3.1.1 If the Model 25S1G4A is operating in an otherwise normal fashion, the front panel display or the wiring to it could be defective.

4.3.1.2 Check the **LOCAL/REMOTE** switch on the unit's front panel; it must be set to the **LOCAL** position in order to operate the front panel **POWER** switch. Check the circuit breaker on the unit's rear panel; it must be set to the "**I**" ("ON") position.

4.3.1.3 If the **"Power On"** indication is not displayed and the cooling fans (Blowers B1, B2) are not running, check to see that the unit is plugged into a live outlet and that the AC line cord is plugged securely into the unit.

4.3.1.4 Check the output voltages from PS1; these voltages should be as follows:

PS1 J2, Pin 1	+12.0 ± 0.3VDC
PS1 J2, Pin 2	+ 5.0 ± 0.2VDC
PS1 J2, Pin 6	+12.0 ± 0.3VDC

4.3.1.5 If output voltages are not present on PS1, check the AC input to PS1.

4.3.1.6 Check the voltages to the A14 Operate/Control Board on connector A14 J1; the voltages should be as follows:

A14 J1, Pin 16	-12.0 ± 0.3VDC
A14 J1, Pin 29	+ 5.0 ± 0.2VDC
A14 J1, Pin 31	+12.0 ± 0.3VDC

4.3.1.7 Check the voltage on A14 J1, Pin 6; it should be ≥4V when the **POWER** switch (S1) is in the normal position and <0.1V when S1 is depressed. S1 is normally open; it is closed only when it is depressed. The amplifier should change state every time the **POWER** switch is depressed.

4.3.1.8 If all voltages are correct and the unit still does not operate, contact Amplifier Research to arrange for repair or replacement of the A14 Operate/Control Board.

4.3.2 The Unit Cannot be Operated Remotely

4.3.2.1 Verify that the front panel **LOCAL/REMOTE** switch is set to the **REMOTE** position.

4.3.2.2 Verify that the unit operates locally by resetting the **LOCAL/REMOTE** switch to the **LOCAL** position; if the unit does not operate locally, see subsection **4.3.1** of this manual.

4.3 TROUBLESHOOTING *(CONTINUED)*

4.3.2 The Unit Cannot be Operated Remotely *(continued)*

4.3.2.3 Check the position of the **"ADDRESS"** switch assembly (SW1) on the A14 Operate/Control Board; this assembly can be accessed through the unit's rear panel. Check to see that these switches are properly set for either RS-232 or IEEE-488 operation, as desired. (See subsection **2.2.2** of this manual for the proper **"ADDRESS"** switch settings.) (**Note:** Address switches are only read at unit power-up; remove and re-apply AC power (i.e., reset the circuit breaker) after changes are made.)

4.3.3 Thermal Fault (Schematic No 1009506)

During a Thermal Fault, the front panel display should read **"Thermal Fault."**

4.3.3.1 Try to reset the unit; if the unit resets and operates normally, check to see that the cooling fans (B1, B2) are operating normally and that the air inlet on the bottom of the unit and the air outlets on the rear of the unit are not blocked.

4.3.3.2 If the unit does not reset and the cooling fans are operating normally, check the voltage at the A14 Operate/Control Board, J1, Pin 4; it should be ≤0.1V.

4.3.3.3 If the voltage on A14 J1, Pin 4 is high, check the thermal daisy chain through S2 and S1 to ground.

4.3.4 Interlock Fault (Schematic No. 1009506)

The Model 25S1G4A is equipped with an interlock connector, which is located on the rear panel. The interlock circuit can be used to sense the openings of doors to screen rooms, test chambers, and so forth, and to turn off RF energy when these doors are opened.

Note: The Model 25S1G4A is shipped with a mating connector, which has a jumper between Pins 1 and 8, installed in the rear panel interlock connector. The unit will not operate unless the interlock circuit is closed.

4.3.4.1 In the event of an Interlock Fault, the front panel display should read **"INTERLOCK FAULT."**

4.3.4.2 Check to see if it is safe to be power up the unit—are there personnel present in the screen room, or are doors to the screen room open?

4.3.4.3 After checking for safety, try to clear the Interlock Fault from the front panel by using the **RESET** switch.

4.3.4.4 If the Interlock Fault will not clear, check for continuity in the External Interlock Circuit (Pin 1 to Pin 8 in the connector, which mate with J2 in the rear panel).

4.3 TROUBLESHOOTING *(CONTINUED)*

4.3.4 Interlock Fault (Schematic No. 1009506) *(continued)*

4.3.4.5 Check the voltage on A15 J1, Pin 18; it should be ≥4.0V.

4.3.4.6 Check the voltage on A14 J1, Pin 20; it should be ≥4.0V.

4.3.4.7 If all of the above voltages are correct and the unit still will not reset, check for defective wiring and/or PWB connections, then try the **RESET** switch again. If the unit still will not reset, the A14 Operate/Control Board is defective. Contact Amplifier Research to arrange for repair or replacement of the A14 Operate/Control Board.

4.3.5 Voltage Faults (Schematic Nos. 1009506 and 1009511)

The Model 25S1G4A's fault circuits sense four voltage faults: **-5V, -15V, +15V, and +16.5V**. The -5V and -15V fault circuits are located on the A15 Regulator Control Board. The +15V and +16.5V fault circuits are located on the A14 Operate/Control Board.

4.3.5.1 -5V Faults: -5V faults are sensed by a fault circuit on the A15 Regulator/Control Board.

4.3.5.2 A15 U5B is a comparator that is used to sense -5V faults. This comparator's output is usually low.

4.3.5.3 The output of A15 U5B should go high if the -5V power supply ≤ 3.8V.

4.3.5.4 The output of A15 U5B is fed to the A14 Operate/Control Board via A14 J1, Pin 25.

4.3.5.5 If the output of A15 U5B is low and the -5V fault cannot be cleared, and the amplifier cannot be reset, then the A14 Operate/Control Board is defective. Contact Amplifier Research to arrange for repair or replacement of the A14 Operate/Control Board.

4.3.5.6 -15V Faults: -15V faults are sensed by a fault circuit on the A15 Regulator/Control Board.

4.3.5.7 A15 U5A is a comparator that is used to sense -15V faults. This comparator's output is usually low.

4.3.5.8 The output of A15 U5A should go high if the-15V power supply is ≤-12.2V.

4.3.5.9 The output of A15 U5A is fed to the A14 Operate/Control Board via A14 J1, Pin 40.

4.3.5.10 If the output of A15 U5A is low and the -15V fault cannot be cleared, and the amplifier cannot be reset, then the A14 Operate/Control Board is defective. Contact Amplifier Research to arrange for repair or replacement of the A14 Operate/Control Board.

4.3 TROUBLESHOOTING *(CONTINUED)*

4.3.5 Voltage Faults (Schematic Nos. 1009506 and 1009511) *(continued)*

4.3.5.11 +15V Faults: +15V faults are sensed by a fault circuit on the A14 Operate/Control Board.

4.3.5.12 If there is a +15V fault that cannot be cleared, check the voltage at A14 J1, Pin 9. If the voltage is >12.7V and the fault will not clear, check the adjustment of R22 on the A14 Operate/Control Board. If the problem cannot be corrected by adjusting R22, then the Operate/Control Board is defective. Contact Amplifier Research to arrange for repair or replacement of the A14 Operate/Control Board.

4.3.5.13 +16.5V Faults: +16.5V faults are detected by a fault circuit on the A14 Operate/Control Board.

4.3.5.14 If there is a +16.5V fault that cannot be cleared, check the voltage on A14 J1, Pin 10. If the voltage is >12.7V and the fault will not clear, check the adjustment of R23 on the Operate/Control Board.

4.3.5.15 If the voltage on A14 J1, Pin 10 is normal (>12.7V) and the fault cannot be cleared by adjusting R23, then the A14 Operate/Control Board is defective. Contact Amplifier Research to arrange for repair or replacement of the A14 Operate/Control Board.

4.3.6 Low or No Power Output (DC Tests) (Schematic No. 1009506)

All indicators on the Model 25S1G4A are normal, the front panel display reads **"Power On,"** and the cooling fans (Blowers B1 and B2) are operating.

4.3.6.1 Check the position of the RF Gain control—is it set to maximum gain?

4.3.6.2 Check the RF input to the unit—is it the correct amplitude and frequency?

4.3.6.3 Check the RF output connection from the unit—is it correctly connected to the load? Is the coaxial cable okay?

4.3.6.4 Check the voltages on Connector J1 of the A3 Linearizer Control Circuit. Troubleshoot any incorrect voltages.

A3 J1, Pin 4	-15 ± 0.4V
A3 J1, Pin 5	15 ± 0.4V
A3 J1, Pin 6	-12.5 ± 1.5V (RF Gain control at maximum gain, input signal <-5dBm).

4.3 TROUBLESHOOTING *(CONTINUED)*

4.3.6 Low or No Power Output (DC Tests) (Schematic No. 1009506) *(continued)*

4.3.6.5 Check the voltages on the feed-through capacitors of the A1 Variable Gain Amplifier with the RF Gain control set for maximum gain. Troubleshoot any incorrect voltages.

A1 C12	-0.7 to -3.5V
A1 C13	4.3 ± 0.5V
A1 C11	-0.1 ± 0.05V
A1 C10	-1.5 ± 0.5V
A1 C9	-4.0 ± 1.0V

4.3.6.6 Check the voltages supplied to the A5 Bias Control Board. Troubleshoot any incorrect voltages.

A5, Pin 3	16.5 ± 0.5V
A5, Pin 1	-5 ± 0.4V

4.3.6.7 Check the voltages on the feed-through capacitors of the A4 One (1)-Watt Amplifier. Troubleshoot any incorrect voltages.

A4 C3, C5, C7	-0.7 to -3.5V
A4 C4	7.6 ± 0.5V
A4 C6	10.2 ± 0.5V
A4 C8	10.2 ± 0.5V

4.3.6.8 Check the voltage on TP1 on the A6 Four (4)-Watt Amplifier; the voltage should be 10.4 ± 0.3V. If the voltage on TP1 is low, check the voltages on C1 and C4 of that amplifier.

4.3.6.9 Check the voltages on TP1 (C21) and TP2 (C22) on the A7, A9, A10, A11, and A12 Quadrature-Coupled Amplifiers ("Quad Amps"); the voltage should be 10.9 ± 0.3V. If any of the voltages on TP1 and TP2 are low, check the voltages on C1 and C4 of that amplifier.

TP1, TP2	10.9 ± 0.3V
C1	16.5 ± 0.3V
C4	-5 ± 0.3V

4.3.7 Low or No Power Output (RF Test) (Schematic No. 1009506)

Note: The DC Tests specified in subsections **4.3.6.1–4.3.6.8** should be completed before conducting the RF tests specified in the following subsections.

Phase matching must be maintained from the output of the A8 Two-Way Splitter to the input of the A13 Four-Way Combiner; if coaxial cables are removed, they must be reinstalled in the same locations from which they were removed. Replacement coaxial cable assemblies must be the same lengths as the original ones.

4.3.7 Low or No Power Output (RF Test) (Schematic No. 1009506) *(continued)*

4.3.7.1 The Model 25S1G4A's typical Gain Response is shown in **Figure 4.3.7.1**. The actual gain may vary considerably from that shown in Figure 4.3.7.1, but it should be ≥**45dB**.

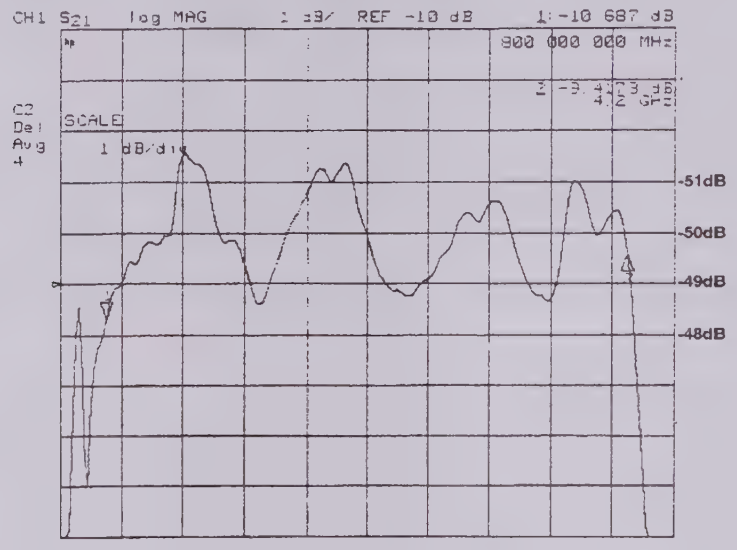


Figure 4.3.7.1
Typical Gain Response: Model 25S1G4A Amplifier

NOTE: If the overall gain is low, the amplifier chain can be separated at the input to the A8 Four-Way Splitter and the gain checked from the input to the A8 Four-Way Splitter to the **RF OUTPUT** connector on the unit's front panel.

4.3.7.2 Remove the coaxial cable from the output of the A7 Quad Amp to the input of the A8 Four-Way Splitter. The typical response from the input of the A8 Four-Way Splitter to the **RF OUTPUT** connector on the unit's front panel is shown in **Figure 4.3.7.2**.

4.3.7 Low or No Power Output (RF Test) (Schematic No. 1009506) *(continued)*

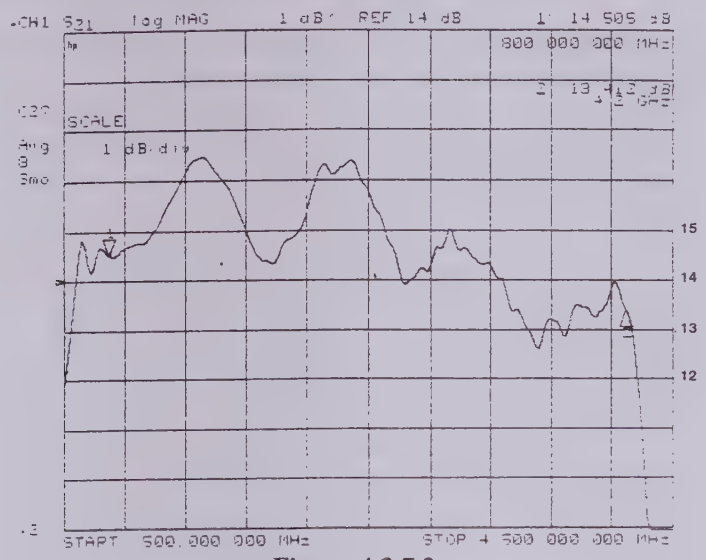


Figure 4.3.7.2
Typical Response: Input A8–Front Panel RF Output

If the response is normal, see subsection **4.3.7.7**. If the response is abnormal, perform the following tests.

4.3.7.3 If the gain is slightly low (i.e., several dB below typical), try disconnecting the inputs from the A9, A10, A11, and A12 Quad Amps one at a time, then reconnect them. Note the difference in response when disconnecting the Quad Amps; if any Quad Amp causes less of a change in gain than the others, check the Quad Amp, coaxial cable, and so forth associated with that Quad Amp. Typical Quad Amp Response is shown in **Figure 4.3.7.3**.

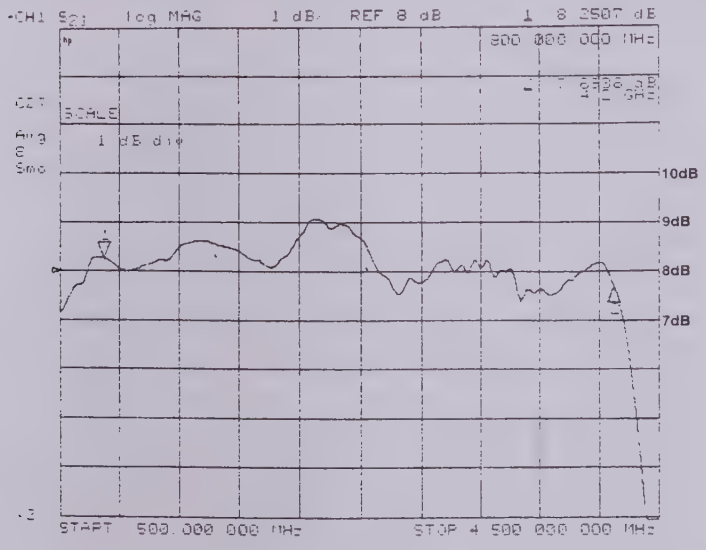


Figure 4.3.7.3
Typical Quad Amp Response

4.3.7 Low or No Power Output (RF Test) (Schematic No. 1009506) *(continued)*

4.3.7.4 If the response of the A9–A12 Quad Amps is normal, check the A8 Four-Way Splitter and the A13 Four-Way Combiner.

4.3.7.5 A typical Four-Way Splitter Insertion Loss is shown in **Figure 4.3.7.5**. The unused ports must be terminated when checking the insertion loss.

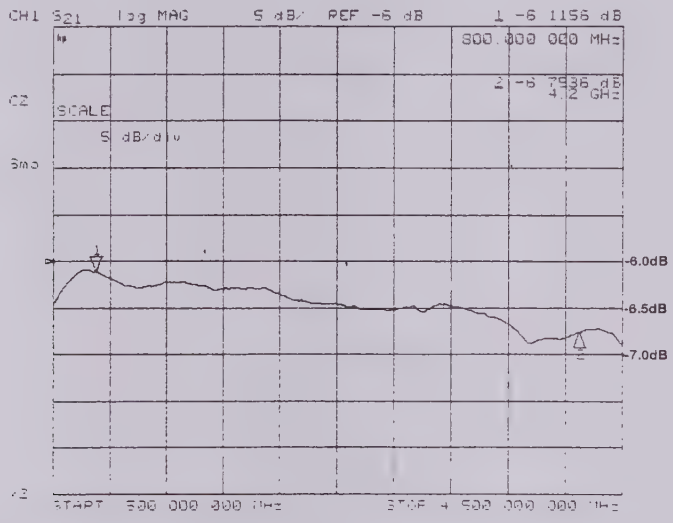


Figure 4.3.7.5
Typical Four-Way Splitter Insertion Loss

4.3.7.6 A typical Four-Way Combiner Insertion Loss is shown in **Figure 4.3.7.6**; a typical Combined Port Return Loss is shown in **Figure 4.3.7.6a**. The unused port must be terminated when checking the insertion loss.

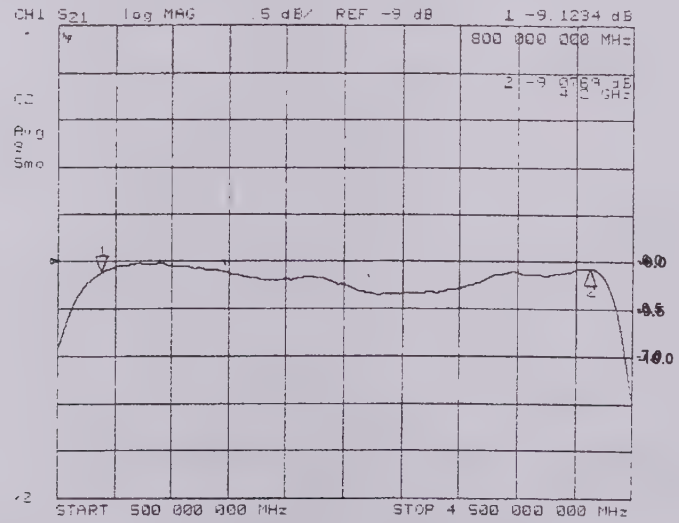


Figure 4.3.7.6
Typical Four-Way Combiner Insertion Loss

4.3.7 Low or No Power Output (RF Test) (Schematic No. 1009506) *(continued)*

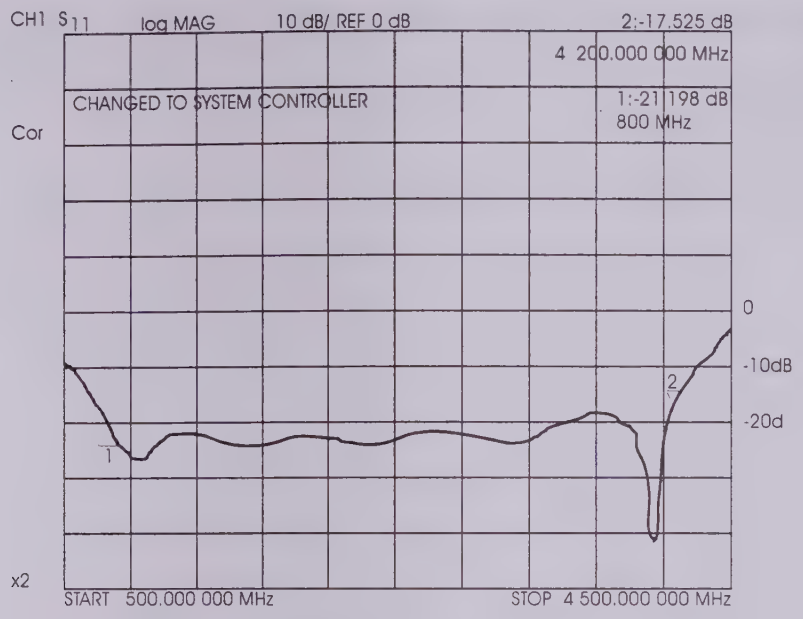


Figure 4.3.7.6a
Typical Four-Way Combiner Return Loss: Combined Output Port

NOTE: The Return Loss of the Four-Way Combiner's combined output port is typically better than **17dB** (see **Figure 4.3.7.6a**). The Return Loss of the Four-Way Combiner's four input ports is approximately **2dB** when one port is driven.

4.3.7.7 If the response of the output stages (i.e., A8 Four-Way Splitter input to front panel RF Output) is normal, check the response of the A7 Quad Amp (see **Figure 4.3.7.7**).

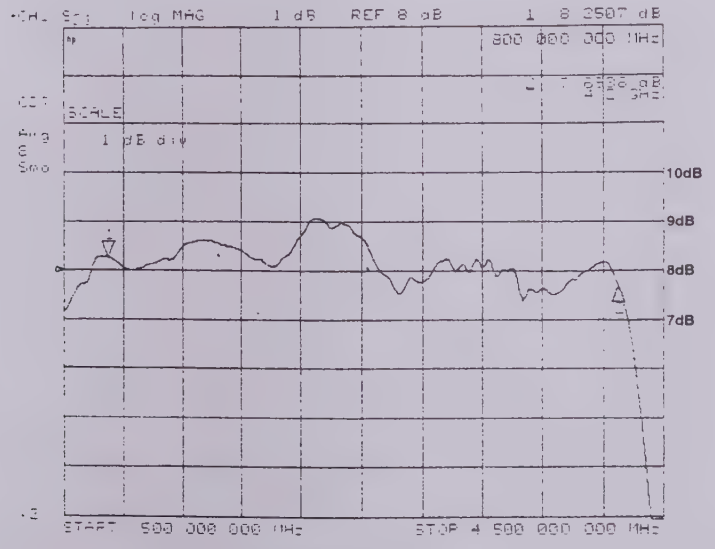


Figure 4.3.7.7
Typical Quad Amp Response

4.3.7 Low or No Power Output (RF Test) (Schematic No. 1009506) *(continued)*

NOTE: The A6 Four (4)-Watt Amplifier's response, the A4 One (1)-Watt Amplifier's response, or the A1 Variable Gain Amplifier's response may differ considerably—particularly in flatness—from the typical responses shown in **Figure 4.3.7.8, Figure 4.3.7.9,** and **Figure 4.3.7.10.**

4.3.7.8 The typical response for the A6 Four (4)-Watt Amplifier is shown in **Figure 4.3.7.8**.

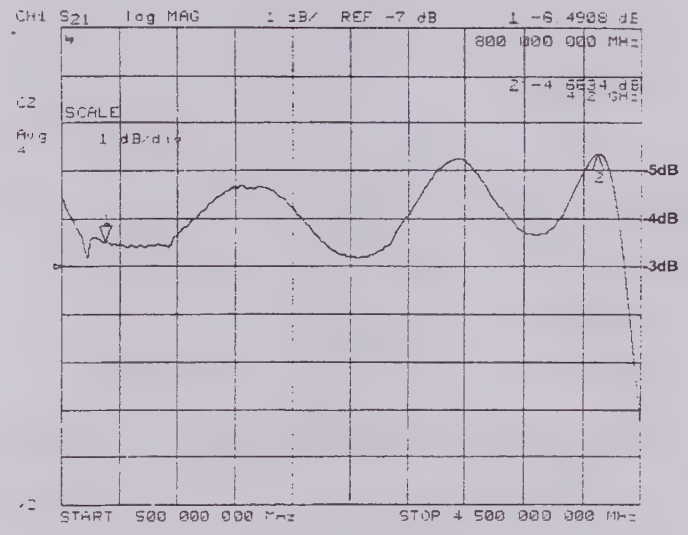


Figure 4.3.7.8
Typical A6 Four (4)-Watt Amplifier Response

4.3.7.9 The typical response for the A4 One (1)-Watt Amplifier is shown in **Figure 4.3.7.9**.

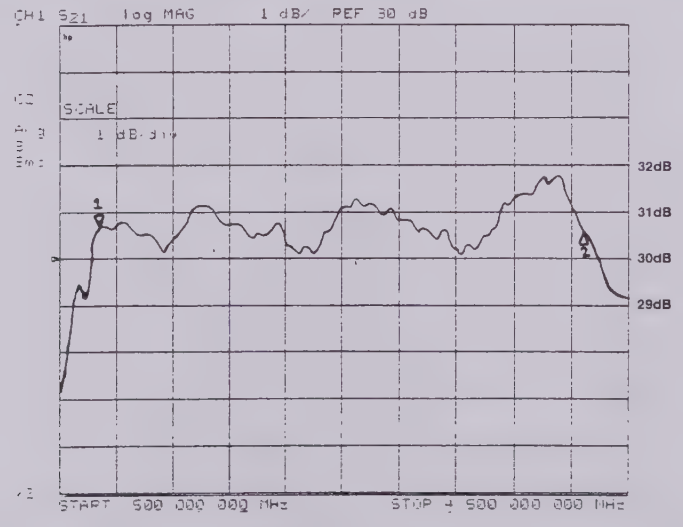


Figure 4.3.7.9
Typical A4 One (1)-Watt Amplifier Response

4.3.7 Low or No Power Output (RF Test) (Schematic No. 1009506) *(continued)*

4.3.7.10 The typical response for the A1 Variable Gain Amplifier (at maximum gain setting) is shown in **Figure 4.3.7.10**.

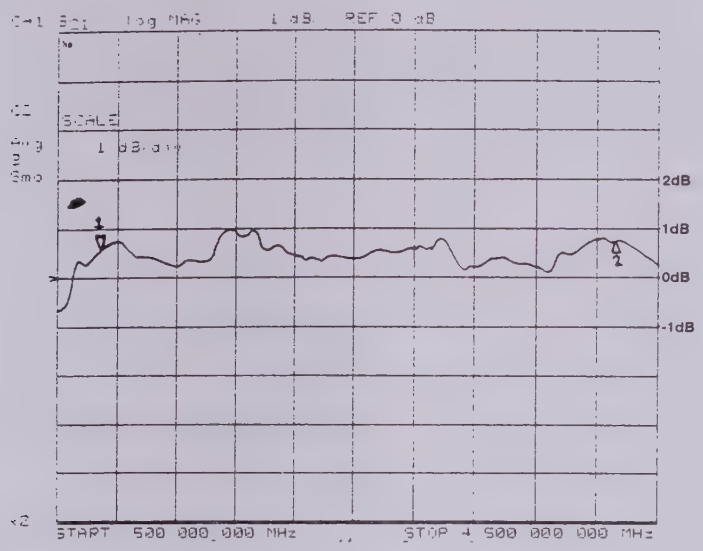


Figure 4.3.7.10
Typical A1 Variable Gain Amplifier Response

SECTION V

REPLACEABLE PARTS

5.1 INTRODUCTION

This section contains information for ordering replacement parts. Information is provided for obtaining parts through Amplifier Research and/or from the manufacturer of the part. Included in this section are the following:

- Ordering Information
- Non-Listed Parts
- Circuit Designators
- Manufacturers' Abbreviation Listing
- Master List
- Schematics and Bills of Material (BOMs)

5.2 ORDERING INFORMATION

To obtain replacement parts, address your order to Amplifier Research, 160 School House Road, Souderton, PA 18964-9990 USA. Please include the instrument's Model Number and Serial Number.

TEL: 215 723-8181

TWX: 510 661-6094

FAX: 215 723-5688

5.3 NON-LISTED PARTS

To obtain a part that is not listed in this section, please include the following information with your order:

a. Instrument Model Number

b. Instrument Serial Number

c. Description of the Part

d. Function and Location of the Part

5.4 CIRCUIT DESIGNATORS

REF = Reference Document

A = Assembly

B = Fan

BT = Battery

C = Capacitor

5.4 CIRCUIT DESIGNATORS *(CONTINUED)*

CB = Circuit Breaker

CR = Diode

DL = Delay Line

DS = Lamp

E = Terminal

F = Fuse

F = Filter

J = Connector, Recept.

K = Relay

L = Inductor

M = Meter

P = Connector, Plug

Q = Transistor, Semiconductor

R = Resistor, Potentiometer

RT = Temperature-Sensing Element

S = Switch

T = Transformer

TB = Terminal Block

TP = Test Point

U = Integrated Circuit

V = Vacuum Tube, Neon Bulb, Photocell, etc.

VR = Zener Diode

W = Wire, Cable

X = Socket

Y = Crystal Unit

5.5 MANUFACTURERS' ABBREVIATION LISTING

This section contains a list of manufacturers' abbreviations. These abbreviations appear under the "Drawing Number" column on the Bills of Material (BOMs). The three letters or symbols before the backward slash represent the name of the manufacturer. The number after the backward slash represents the manufacturer's part number. See **Appendix A** (at the end of this section) for a complete listing of manufacturers' abbreviations.

5.6 MASTER LIST

The Master List provides the user with a quick view of the major assemblies of a unit. The assemblies are displayed in an indented format, with the corresponding schematic shown in the right column.

5.7 SCHEMATICS AND BILLS OF MATERIAL (BOMS)

The schematics and BOMs are arranged in sequence according to the Master List. The schematic that appears first on the Master List also appears first in the schematic and BOM section. Following each schematic are the appropriate BOMs relating to the schematic. This pattern is repeated throughout this section.

The BOMs used in this manual are computer-generated. Each computer part number appears only once on a BOM, along with the total quantity used and all of the applicable circuit designators. The BOMs are designed to organize the parts in alphanumeric order of their circuit designators. Typical manufacturer part numbers can be found in the drawing number column. The manufacturer's abbreviation appears first, separated by a backward slash, which is followed by the part number.

Amplifier Research has assigned computer product numbers to all parts in inventory. The computer product numbers are located on the left side of the BOM in the "Part Number" field. When referencing or ordering parts from Amplifier Research, it is best to use the computer product number. Parts may also be ordered directly from the manufacturer by using the manufacturer's part number, if desired.

AAV ..... AAVID
ABB ..... ABBEON
ACA ..... ANTENNA CORPORATION OF AMERICA
ACO ..... ARCO
ADA ..... ADALET
AND ..... ASTRO DYNE
AEC ..... ARNOLD ENGINEERING COMPANY
AEP ..... APPLIED ENGINEERING PRODUCTS
AER ..... AEROQUIP
AEX ..... AEROVOX
AHC ..... AIRLINE HYDRAULICS CORPORATION
AIN ..... AIN PLASTICS
AIR ..... AIRPAX
AIT ..... AERITALIA
AJO ..... A. J. OSTER FOILS INCORPORATED
ALC ..... ALCO
ALE ..... ALLIED ELECTRONICS
ALI ..... ASTROLAB INCORPORATED
ALP ..... ALPHA
AMA ..... AMATOM
AMC ..... AMPEX CORPORATION
AMH ..... AMPHENOL
AMI ..... AMPLIFONIX INCORPORATED
AMP ..... AMP INCORPORATED
AMR ..... AMREP
AMS ..... AMERICAN STANDARD
AND ..... ANALOG DEVICES
ANZ ..... ANZAC
APG ..... AP-O-GEE INDUSTRUES
APN ..... AMERICAN PRECISION
APO ..... AMPROBE
APP ..... A. P. PRODUCTS INCORPORATED
APR ..... AMPERITE
APX ..... AMPEREX
ARC ..... AMPLIFIER RESEARCH CORPORATION
ARE ..... ARROW ELECTRONICS
ARO ..... AROMAT CORPORATION
ARP ..... APPLE RUBBER PRODUCYS INCORPORATED
ASB ..... ASTRO-BUBBLES
ASC ..... AMERICAN SWITCH CORPORATION
ASD ..... AMERICAN STANDARD
ASP ..... ASSOCIATED SPRING
AST ..... ASTEC
ATC ..... AMERICAN TECHNICAL CERAMICS CORPORATION
ATL ..... ATLEE
AUG ..... AUGAT INTERCONN COMP DIVISION
AVA ..... AVA CORPORATION
AVF ..... ALLENTOWN VALVE & FITTING COMPANY
AVT ..... AVANTEK
AVX ..... AVX CORPORATION
A-B ..... ALLEN BRADLEY
A-C ..... ANDREW CORPORATION
A-M ..... AEC MAGNETICS
A-S ..... ALCOSWITCH

A-T	AHAM-TOR
BBI	BARON-BLAKSLEE INCORPORATED
BDX	BENDIX
BEG	BERG CORP
BEL	BELDEN
BER	BERKLEY & COMPANY
BEY	BEY ELECTRIC
BFG	B.F. GOODRICH
BFI	BUCKEYE FORGE INCORPORATED
BKM	BECKMAN
BLL	BELLING LEE
BOK	BOKER'S INCORPORATED
BOP	BOPLA ENCLOSURES
BOR	BOURNS
BRD	BIRD ELECTRONICS
BRG	BERGQUIST
BUD	BUD COMPANY
BUL	BULGIN
BUS	BUSS
B-C	BONCO CORPORATION
B-E	BRIM ELECTRONICS
B-T	BEAU-TECH
B-V	BEAU/VERNITRON
CAD	CADDOCK
CAM	CAMBION
CAN	CANNON
CAP	CANPACK
CAR	CARLING
CAT	CATAMOUNT
CCI	CRL COMPONENTS INCORPORATED
CDC	COMPACT DEVELOPMENT CORPORATION
CDI	COAXIAL DYNAMICS INCORPORATED
CEN	CENTURY ELECTRONICS
CES	COUNTY ELECTRIC SUPPLY COMPANY
CGI	COMPONENT GENERAL INCORPORATED
CHE	CHERRY
CHO	CHOMERICS
CHR	CONNETICUT HARD RUBBER
CIN	CINCH
CJS	CENTRAL JERSEY SCREW & BOLT
CKS	C & K COMPONENTS INCORPORATED
CLA	CLAROSTAT
CLC	CHICAGO LOCK COMPANY
CMI	CERAMIC MAGNETICS INCORPORATED
CMP	COMMERCIAL PLASTICS
CMT	CONTINENTAL MICROWAVE & TOOL
CNF	CINCINNATI FAN
COE	COMP ENTERPRISES
COL	COLDER PRODUCTS
COM	COMPUCON
CON	CONCORD ELECTRONICS
COP	COMPLETE PACKAGING
COR	CORCOM
CPC	C.P. CLARE

CPI ..... COMPUTER PRODUCTS INC.
CPL ..... COMPULITE
CPS ..... COLOR PRINT SCREENING
CRC ..... CRC CHEMICALS
CTS ..... CTS OF BERNE INCORPORATED
CUS ..... CUSTOM
C-D ..... CORNELL-DUBILIER
C-E ..... CORNING ELECTRONIC
C-I ..... CRAFTECH INDUSTRIES
C-P ..... CAPLUG COMPANY
C-T ..... CANADIAN THERMOSTATS
CWD ..... CESIWID INCORPORATED
DAL ..... DALE
DAT ..... DATEL INC
DEL ..... DELKER
DAY ..... DAYTON
DEN ..... DENNISON
DIA ..... DIALIGHT
DII ..... DATONA INDUSTIRES INCORPORATED
DIL ..... DIELECTRIC LABS
DKK ..... DOW KEY/KILOVAC
DLS ..... DALLAS SEMICONDUCTOR
DLT ..... DELTRON
DSC ..... DE-STA-CO
DTP ..... DOYLESTOWN PRINTING
DUP ..... DU PONT ELECTRONICS
DYN ..... DYNATECH
D-E ..... DARBURN ELECTRONICS
D-G ..... DIMCO-GRAY
D-K ..... DIGI-KEY-CORPORATION
EBM ..... EBM IND.
ECO ..... EATON CORPORATION
ECS ..... ECS INTERNATIONAL
EFJ ..... E.F.JOHNSON
EGG ..... EG & G OPTOELECTRONICS
EGL ..... ELGAL
EIC ..... ELCTRO INSULATION CORPORATION
EII ..... EDAL INDUSTRIES INC.
EIM ..... EIMAC
ELC ..... ELECTRO SWITCH CORPORATION
ELM ..... ELMENCO
ELR ..... ENGLER INSTRUMENT
EMC ..... E.M.C. TECHNOLOGY
EMI ..... ELECTRONIC MEASUREMENTS,INC.
EMM ..... ENGLEMANN MICROWAVE
EOD ..... ELECTRO-OPTIC DEV
ERI ..... ERIE TECHNOLOGY PRODUCTS
ERM ..... EREM CORPORATION
ESX ..... ESSEX
ETA ..... ETA
EVE ..... EVEREST ELECTRONIC EQUIPMENT
EVR ..... EVEREADY
EWS ..... ELMWOOD SENSOR
E-C ..... EMERSON AND CUMMING

EZF ..... EZ FORM CABLE CORPORATION
FAR ..... FARNELL COMPONENTS
FCH ..... FAIRCHILD
FCI ..... FILTER CONCEPTS INCORPORATED
FER ..... FERRONICS
FEX ..... FERROXCUBE
FLO ..... FLO TRAN PNEU-DRAULICS INCORPORATED
FLP ..... FLURO PLASTICS
FOS ..... FIBRE OPTIC COMMUNICATION SPECIALTIES
FRA ..... FRANZUS
FRK ..... FROST KING
FRM ..... FREEDMAN/MALTA
FRP ..... FAIR-RITE PRODUCTS
FUJ ..... FUJITSU
FWC ..... FW CAPACITORS
F-S ..... FASTENER SPECIALTY
GAL ..... GALLAGER
GCE ..... G.C. ELECTRONICS
GCS ..... GLOBAL COMPUTER SALES
GEM ..... GEM
GDC ..... GENERAL DEVICES CO.
GOL ..... GOLDKAMP
GRA ..... GRAINGER
GRE ..... GREYARC
GRS ..... GENERAL RADIO SUPPLY
GRY ..... GRAYHILL CORP
GSI ..... GSI
GTL ..... GILWAY TECHNICAL LAMP
G-E ..... GENERAL ELECTRIC COMPANY
G-I ..... GENERAL INSTRUMENT
GUD ..... GUDEN
HAD ..... HARRY DAVIES
HAN ..... HANSON
HAR ..... HARRIS CORP
HAV ..... HAVERHILL CABLE AND MANUFACTURING
HDB ..... HOMER D. BRONSON
HEC ..... HIGH ENERGY CORPORATION
HEI ..... HEINEMANN
HEY ..... HEYCO MOLDED PRODUCTS
HEX ..... HEXACON
HHS ..... H.H. SMITH
HII ..... HOLODAY INDUSTRIES INCORPORATED
HIM ..... HITACHI MAGNETS
HMF ..... HILTON MANUFACTURING
HMN ..... HENRY MANN
HOF ..... HOFFMAN PRODUCTS
HOL ..... HOLLINGSWORTH
HOW ..... HONEYWELL
HPC ..... H.P.CADWALLADER
HSI ..... HUBER & SUHNER INCORPORATED
HUB ..... HUBBEL
HUC ..... HUDSON CAN COMPANY
HUV ..... HANDLES UNLIMITED VERMALINE DIV.
HWK ..... HAWKINS METAL FABRICATION

H-C ..... HARTWELL CORP. COMMERCIAL DIVISION
H-P ..... HEWLETT/PACKARD
H-R ..... HERBACH & RADEMAN
IBM ..... IBM
ICI ..... ILLINOIS CAPACITOR INCORPORATED
IDE ..... IDEAL
IER ..... IERC
ILS ..... ILSCO
IMB ..... IMB
IMC ..... IMC
IML ..... IMLEC
INC ..... INTERNATIONAL CRYSTAL MFG COMPANY
INM ..... INMET
INT ..... INTERMATIC INC
IPI ..... INSULFAB PLASTICS INCORPORATED
IRC ..... INTERNATIONAL RESISTIVE COMAPNY, INC.
IRM ..... IR-CRYDOM
ITF ..... ITERFAN
ITJ ..... ITT-JENNINGS
ITT ..... ITT CANNON
I-E ..... IMPERIAL EASTMAN
I-G ..... INDIANA GENERAL
I-R ..... INTERNATIONAL RECTIFIER CORPORATION
I-S ..... INSTRUMENT SPECIALTIES
JAR ..... J.A. REINHARDT
JDE ..... JOHANSON DIELECTRICS
JER ..... JERGENS INCORPORATED
JFD ..... JFD
JOH ..... JOHANSON
JON ..... JONATHAN MANUFACTURING
JOR ..... JORITA
JSR ..... JAY-CEE SALES & RIVET INC.
KCC ..... KEYSTONE CARBON COMPANY
KEY ..... KEYSTONE ELECTRONICS
KIN ..... KINGS
KLE ..... KLEIN
KSD ..... KESTER SOLDER DIVISION
KUL ..... KULKA
K-D ..... KD COMPONENTS
LAF ..... LAFRANCE CORPRATION
LBA ..... LAMBDA ELECTRONICS INCORPORATED
LEM ..... LIAISONS ELECTRONIQUES MECHANIQUES
LEV ..... LEVITON MANUFACTURING COMPANY
LIF ..... LITTLEFUSE
LOC ..... LOCTITE CORPORATION
LOR ..... LORD CORPORATION
LTC ..... LINEAR TECHNOLOGY COPR
MAC ..... MACOM
MAL ..... MALLORY
MAR ..... MARKEL CORPORATION
M-C ..... MICROCHIP
MCG ..... McGILL
MCR ..... MICREL INCORPORATED
MCS ..... McMASTER CARR SUPPLY COMPANY

MCX ..... MICRO-COAX
MDC ..... MICROWAVE DEVELOPMENT CO.
MDP ..... MODPAK
MEA ..... MITSUBISHI ELECTRONICS AMERICA, INC.
MEP ..... MEPCO-ELECTRA
MET ..... METUCHEN CAPACITOR
MFG ..... MANUFACTURER
MHW ..... M.H. & W. COMPANY
MIC ..... MICROMETALS IRON POWDER CORES
MIN ..... MINI-CIRCUITS
MIP ..... MICRO PLASTICS
MIR ..... MINOR RUBBER COMPANY
MIS ..... MICROSWITCH
MIT ..... MULTITHERM CORPORATION
M-K ..... MK
MLC ..... M. LADER COMPANY
MLX ..... MILL-MAX CORP
MMI ..... MAGNETIC METALS INCORPORATED
MMM ..... MINNESOTA MINING MANUFACTURING
MOC ..... MOCAP
MOD ..... MODUTEC
MOL ..... MOLEX
MOR ..... MORS COMPONENTS INC
MON ..... MONSANTO
MOS ..... M/A-COM OMNI SPECTRA INCORPORATED
MOT ..... MOTOROLA
MPC ..... MULTI-PRODUCTS
MRS ..... MARSH
MSC ..... MICROSEMI CORPORATION
MUE ..... MUELLER
MUR ..... MURATA/ERIE
MWA ..... MICROWAVE ASSOC
MWC ..... MIDWEST COMPONENTS
MWM ..... MIDWEST MICROWAVE
MWS ..... MICROWAVE SEMI-CONDUCTORS
M-C ..... M & C SPECIALTIES
M-E ..... MASTER ELECTRICIAN
M-M ..... MULTI-MAX CORPORATION
NAB ..... NORTH AMERICAN BRASS AND COPPER
NEB ..... NEBS INCORPORATED
NET ..... NETEK
NEW ..... NEWAGE INDUSTRIES
NIA ..... NIAGRA PLASTICS
NIC ..... NIC COMPONENTS
NIE ..... NIELSEN HARDWARE
NJS ..... N.J. SEMI
NKK ..... NKK SWITCHES
NMB ..... NMB TECHNOLOGIES INCORPORATED
NOB ..... NOBLITT BROTHERS & COMPANY
NOR ..... NORITAKE
NPP ..... NORTH PENN POLISHING & PLATING
NSI ..... NATIONAL SEMI-CONDUCTOR CORPORATION
NVS ..... NORTHAMPTON VALLEY SERVICE COMPANY
N-I ..... NATIONAL INSTRUMENTS

N-M ..... NATIONAL MOLDITE
N-P ..... NEM-PACK
OAP ..... OLEAN ADVANCED PRODUCTS
OHA ..... OHIO ART
OHN ..... OHMLITE
OKI ..... OK INDUSTRIES
OME ..... OMEGA
OMR ..... OMRON
OPM ..... OPTIMA
OPT ..... OPTIMAX
PAE ..... PACIFIC ELECTRICORD
PAJ ..... PHILLIPS AND JACOBS
PAM ..... PAMOTOR
PAN ..... PANASONIC
PAP ..... PAPST
PBC ..... POTTER & BRUMFIELD CORPORATION
PCI ..... PENN CRAFT INDUSTRIES
PEC ..... PENN CONTROLS
PCC ..... PANEL COMPONENTS CORPORATION
PEK ..... PEAK
PEN ..... PENN ENGINEERING
PFL ..... POLYFLON
PFS ..... POWER FILM SYSTEMS
PHC ..... PARKER HANNIFIN CORPORATION
PHI ..... POWER HYBRID
PLM ..... PLASTIC & METALS
PMP ..... PRECISION METAL PROD.
PMI ..... PRECISION MONOLITHICS INC.
PNT ..... PANDUIT
P-O ..... POWER ONE
POW ..... POWEREX
PRC ..... PRECISION RUBER COMPANY
PSI ..... POWER SEMI-CONDUCTOR INCORPORATED
PSP ..... PROJECT SUPPORT INCORPORATED
PTC ..... PRECISION TUBE COMPANY
P-B ..... PENN-BASCO
QUI ..... QUICKSET
RAA ..... RADIALL
RAF ..... R.A.F. ELECTRONIC HARDWARE INCORPORATED
RCA ..... RCA
RCC ..... RAYCHEM CORPORATION
RCL ..... RCL
REL ..... RELIANCE MICA COMPANY
REM ..... REMTEK
RES ..... ROSE ENCLOSURES SYSTEMS
RFP ..... RF POWER COMPONENRS INC
RIC ..... RICHCO
ROG ..... ROGAN
RON ..... RONCO CORPORATION
ROS ..... ROSS ENGINEERING
ROT ..... ROTRON
ROW ..... ROWLAND
RPC ..... REPUBLIC PACKAGING CORPORATION
RUS ..... RUSSEL INDUSTRIES

R-H ..... RYAN HERCO
R-N ..... ROBINSON-NUGENT
R-S ..... RADIO SHACK
SAG ..... SAGE LABORATORIES
SAM ..... SAMTECH
SBC ..... SCHROEDER BROTHERS CORPORATION
SCD ..... SCHADOW
SCH ..... SCHAUER
SCI ..... SPECTRUM CONTROL INCORPORATED
SCO ..... SCOTCH
SEA ..... SEASTROM INCORPORATED
SEL ..... SELECTRO CORPORATION
SEM ..... SEMIKRON
SEV ..... SEVENTY-THREE MANUFACTURING COMPANY
SGL ..... SGL INDUSTRIES
SGS ..... SGS
SIE ..... SIEMENS
SIG ..... SIGNETICS
SIM ..... SIMPSON
SLE ..... SL ELECTRONICS
SOC ..... SOUTHCO
SOE ..... STANDARD OIL ENGINEERING
SOH ..... SOHIO
SOL ..... SOLDAPULLT
SOW ..... SOLDER WICK
SPC ..... SPC TECHNOLOGY
SPE ..... SPECTROL
SPL ..... SPRA-LUBE
SPR ..... SPRAGUE
SPS ..... SPRINGFIELD PAPER SPECIALISTS
SQR ..... SQR SECURITY COMPONENTS
SSI ..... SWITCHING SYSTEMS INTERNATIONAL
SSM ..... SOLD STATE MICROWAVE
SSS ..... S & S TECH
SST ..... SST
STA ..... STANCOR
STB ..... SEAL-TITE BAG COMPANY
STI ..... STIMPSON
STM ..... SEASTROM MANUFACTURING COMPANY
STP ..... STACKPOLE
STW ..... STOCKWELL
SUS ..... SUNSHINE SCIENTIFIC
SWC ..... SWITCHCRAFT
SHW ..... STEWERT-WARNER HOBBS DIVISION
S-B ..... SPEED BEND
S-E ..... STEMCO/ENGLER
S-F ..... SYDNEY FRIEDRICH
S-L ..... SWAGELOCK
S-M ..... STRIP-MASTER
TAB ..... THOMAS & BETTS
TAI ..... TAI CORPORATION
TAN ..... TANSISTOR
TCC ..... THOMSON PASSIVE COMPONENTS CORP
TCI ..... TRA-CON INCORPORATED

TEC ..... TECKNIT
TEL ..... TELEFUNKEN
TEM ..... TEMPIL
TET ..... TECHNITOOL
TFI ..... THRUWAY FASTNERS INCORPORATED
THM ..... THERMALLOY
THS ..... THREADED SCREW PRODUCTS COMPANY
TII ..... TEXAS INSTRUMENTS INCORPORATED
TMS ..... TIMES MICROWAVE SYSTEMS
TRD ..... TRIAD
TRI ..... TRI-COUNTY
TRS ..... TRI-STATE
TRT ..... TRAVERS TOOL COMPANY
TRU ..... TRU CONNECTORS
TRW ..... TRW
TUS ..... TUSONIX
TXS ..... TEXAS SPECTRUM
T-P ..... THOMAS PRODUCTS
UEC ..... UNITED ELECTRIC
ULI ..... ULINE
UNC ..... UNICORP
UN ..... UNELCO
UNI ..... UNIROYAL
UNM ..... UNIMEC
USC ..... USECO
UTI ..... UTICA
V-C ..... VICOR INC.
VFL ..... VITAFOAM LIMITED
VIC ..... VICTOREEN
VIT ..... VITRAMON
VLR ..... VLEIR
VOL ..... VOLTRONICS CORPORATION
WAG ..... WAGO COPR
WAK ..... WAKEFIELD
WAL ..... WALDOM
WCO ..... WECO
WEC ..... WESTERN ENTERPRISES COMAPNY
WEI ..... WEICO
WEL ..... WELLER
WES ..... WEINSTEIN
WGV ..... WARREN G-V
WIE ..... WIELAND
WIL ..... WILTRON
WIS ..... WEBER INDUSTRIAL SUPPLY COMPANY
WIT ..... WITTEK DIVISION, A MICRODOT COMPANY
WPI ..... WIRE PRODUCTS INCORPORATED
WPS ..... WORKPLACE SYSTEM
WSC ..... WEST POINT SUPPLY COMPANY
WWP ..... WESTERN WIRE PRODUCTS
W-E ..... WELLS ELECTRONIC INCORPORATED
W-I ..... WEIDMULLER INCORPORATED
W-L ..... WARD LEONARD
XAC ..... X-ACTO
XCA ..... XCELITE

YNG ..... YOUNGS
YPC ..... YARDLEY PRODCTS CORPORATION
ZER ..... ZERO MANUFACTURING COMPANY
ZIE ..... ZIERIC

BILL NO: 1009521-501M REV: B U/M: EA DRAWING NO:
MDL,MODEL 25S1G4A

SEQ	PART NUMBER	REV	D E S C R I P T I O N	U/M	QUANTITY-PER	DRAWING NUMBER	REF-DSGN
5000	1009506	C	BLOCK DIAG,MODEL 25S1G4A	EA	REF	ARC-C\1009506	R(A)
5010	1009507	-	ASSY DWG,MODEL 25S1G4A	EA	REF	ARC-D\1009507	R(B)
5020	1009507-501	C	MODEL 25S1G4A,25 WATTS,800MHz-4.2GHz	EA	REF	ARC-D\1009507	BOM
5030	1009508	-	ASSY DWG,FINAL AMP ASSY	EA	REF	ARC-D\1009508	R(B)
5040	1009508-501	-	FINAL AMP ASSY	EA	REF	ARC-D\1009508	BOM
5050	1009509	C	ASSY DWG,AMP ASSY	EA	REF	ARC-D\1009509	R(B)
5060	1009509-501	A	AMP ASSY	EA	REF	ARC-D\1009509	BOM
5070	1008009	-	ASSY DWG,CABLE ASSY	EA	REF	ARC-B\1008009	B
5080	1008009-501	-	CABLE ASSY,COAX,SIMI-RIGID	EA	REF	ARC-B\1008009	BOM
5090	1008010	-	ASSY DWG,CABLE ASSY	EA	REF	ARC-B\1008010	B
5100	1008010-501	-	CABLE ASSY,COAX,SEMI-RIGID	EA	REF	ARC-B\1008010	BOM
5110	1009518	B	ASSY DWG,RF ASSY	EA	REF	ARC-D\1009518	R(B)
5120	1009518-501	C	RF ASSY	EA	REF	ARC-D\1009518	BOM
5130	1008816	A	SCHEMATIC,VAR GAIN,PROTECTOR CIRCUIT	EA	REF	ARC-D\1008816	B
5140	1008812	-	SCHEM DIAG,VARIABLE GAIN AMP/DET	EA	REF	ARC-D\1008812	R(B)
5150	1008810	E	ASSY DWG,VARIABLE GAIN AMP/DET	EA	REF	ARC-D\1008810	R(B)
5160	1008810-501	C	PWB ASSY,VARIABLE GAIN AMP/DET	EA	REF	ARC-D\1008810	BOM
5170	1007392	F	SCHEM DIAG,LINEARIZER CONT.	EA	REF	ARC-C\1007392	R(A)
5180	1007454	E	ASSY DWG,PWB ASSY,LINEARIZER/CTRL BD	EA	REF	ARC-B\1007454	B
5190	1007454-501	H	PWB ASSY,LINEARIZER/CTRL BD	EA	REF	ARC-B\1007454	BOM
5200	1010902	A	SCHEM DIAG,BIAS CONTROL	EA	REF	ARC-B\1010902	B
5210	1010749	B	SCHEM DIAG,BIAS CTRL	EA	REF	ARC-B\1010749	B
5220	1010589	B	ASSY DWG,LOW LEVEL "S" MODULE	EA	REF	ARC-C\1010589	R(A)
5230	1010589-501	A	PWB ASSY,LOW LEVEL "S" MODULE	EA	REF	ARC-A\1010589	BOM

BILL NO: 1009521-501M REV: B U/M: EA DRAWING NO:
MDL,MODEL 25S1G4A

SEQ	PART NUMBER	REV	D E S C R I P T I O N	U/M	QUANTITY-PER	DRAWING NUMBER	REF-DSGN
5240	1010748	A	ASSY DWG,BIAS CTRL,1W S MODULE	EA	REF	ARC-C\1010748	R(A)
5250	1010748-501	B	PWB ASSY,BIAS CTRL,1W S MODULE	EA	REF	ARC-C\1010748	BOM
5260	1009543	B	SCHEM,4 WATT AMP	EA	REF	ARC-C\1009543	R(A)
5270	1009542	D	ASSY DWG,4 WATT AMP ASSY	EA	REF	ARC-C\1009542	R(A)
5280	1009542-501	B	4 WATT AMP ASSY	EA	REF	ARC-C\1009542	BOM
5290	1009163	E	SCHEM DIAG,QUAD AMP,100S1G4	EA	REF	ARC-C\1009163	R(A)
5300	1009161	F	ASSY DWG,QUAD AMP	EA	REF	ARC-D\1009161	R(B)
5310	1009161-501	J	PWB ASSY,QUAD AMP,100S1G4	EA	REF	ARC-A\1009161	BOM
5320	1010072	A	ASSY DWG,4 WAY SPLITTER #3	EA	REF	ARC-C\1010072	R(A)
5330	1010072-501	A	PWB ASSY,4 WAY SPLITTER #3	EA	REF	ARC-C\1010072	BOM
5340	1008056	-	ASSY DWG,COMBINER ASSY, 4 WAY	EA	REF	ARC-C\1008056	R(A)
5350	1008056-501	A	COMBINER ASSY,4 WAY	EA	REF	ARC-C\1008056	BOM
5360	1009510	D	ASSY DWG,PS ASSY	EA	REF	ARC-D\1009510	R(B)
5370	1009510-501	C	PS ASSY	EA	REF	ARC-D\1009510	BOM
5380	1009514-501	C	HARNESS ASSY,PS	EA	REF		BOM
5390	1009662	D	ASSY DWG,CTRL PNL ASSY	EA	REF	ARC-D\1009662	R(B)
5400	1009662-501	D	CTRL PNL ASSY	EA	REF	ARC-D\1009662	BOM
5410	1009511	-	SCHEM DIAG,REG CTRL BD	EA	REF	ARC-C\1009511	R(A)
5420	1009512	-	ASSY DWG,REG CTRL BD	EA	REF	ARC-C\1009512	R(A)
5430	1009512-501	-	REG CTRL BD ASSY	EA	REF	ARC-C\1009512	BOM
5440	1008597	B	SCHEM DIAG,OPERATE/CONTROL(OCB)	EA	REF	ARC-D\1008597	R(B)
5450	1008595	D	ASSY DWG,OPERATE/CONTROL(OCB)	EA	REF	ARC-C\1008595	R(A)
5460	1008595-501	C	PWB ASSY,OPERATE/CONTROL(OCB)	EA	REF	ARC-C\1008595	BOM

ECN	DATE	REV
–	21JUN94	1
–	02JUL98	2
RE	22JUL98	–
9655	22SEP98	A
10450	10NOV00	B
10564	07MAR01	C

RELEASE NO 1176-101

W1 RF INPUT

A1 VAR GAIN AMP SCHEM 1008812 — ATTN — C8 C10 C11 C12 C13 — D16

W14

A4 1 WATT AMP SCHEM 1010589

W2

A5 BIAS CTRL CKT SCHEM 1010902

A3 LINEARIZER/CTRL CKT SCHEM 1007392

R1 10K CW, R2 12K

P/O J3 P7, P/O P1, P/O J1, J2, P5, P6

P11-8, P11-10, P11-9 TO A15

+16.5V, GND, -5V

A6 1 WATT AMP — C4 C1 — -5V +16.5V

W3

A7 QUAD C28 AMP — FAULT OUT — C4 C1 — -5V +16.5V

W4

A8 SPLITTER

W5 W6 W7 W8

A9 A10 A11 A12 QUAD C28 AMP — FAULT OUT — C4 C1 — -5V +16.5V

W9 W10 W11 W12

A13 COMBINER

W13 RF OUTPUT

-5V TO A9,A10,A11, AND A12

S1 S2

FL1 — LINE, NEUT, GND

CB1

K1

(A14,J1-10) (-16.5V TO A9, A10,A11,A12)

PS2 — LINE, NEUT, GND — +16.5V, +24V, -24V — PS INHIBIT — J1 P8

P3 J1 — LINE, NEUT — PS1 24V — +12V +5V GND -12V — P1 J2 P4

(B1) (B2)

S3 PWR, S4 REMOTE/LOCAL, S5 FAULT RESET — P/O J3 P7

DISPLAY — J1 P9

A14 OPERATE/CONTROL (OCB) SCHEMATIC 1008597

K1, THERMAL FAULT, P.S. INHIBIT, +12V, +5V, -12V

FAULT DET. -5V FAULT, -15V FAULT, +15V FAULT, +18.5V FAULT (+18.5V PS2)

AMP FAULT, REMOTE INTLK

P/O P1 J1

EEE-488 (J2), RS232 (P3)

A15 REGULATOR/CONTROL BD. SCHEMATIC 1009511

+12V IN, OPERATE IN, -5V FAULT OUT, -15V FAULT OUT, -15V, AMP FAULT, REMOTE GAIN ENABLE, ANALOG GAIN SIGNAL

TO K1 +12V, -5V OUT, +16.5V IN, -15V OUT, +15V OUT

+24 IN, -24V IN, A7 FAULT (A7-C28), A8 FAULT (A8-C28), A10 FAULT (A10-C28), A11 FAULT (A11-C28), A12 FAULT (A12-C28)

RF GAIN CONT.(WIPER), LINEARIZER/CTR GAIN, LINEARIZER/CTR. DET. OUT

J2 P10 — INTERLOCK

NOTICE TO PERSONS RECEIVING THIS DOCUMENT: THIS DOCUMENT IS THE PROPERTY OF AMPLIFIER RESEARCH AND THE DATA CONTAINED HEREIN SHALL BE MAINTAINED IN STRICT CONFIDENCE, AND NOT DISCLOSED, COPIED OR USED FOR MANUFACTURING OR SALE OF ANY PRODUCT WITHOUT PRIOR WRITTEN CONSENT OF AMPLIFIER RESEARCH.

QTY REQD.	PART NO	DESCRIPTION
	PARTS LIST	

UNLESS OTHERWISE SPECIFIED DO NOT SCALE DRAWING. DIMENSIONS ARE IN INCHES AND INCLUDE PLATING THICKNESS. ALL THREADS ARE UNIFIED NATIONAL SERIES, CLASS 2. REMOVE ALL BURRS AND SHARP EDGES.

	ANGULAR	X PLACE DECIMALS	X PLACE DECIMALS
MACH	±0°30'	±.02	±.005
WELD	±1°	±.03	±.010

25S1G4A

USED ON MODEL

DRAWN	J.H.REED	DATE 09 JUNE 98
CHKD	J.H.REED	DATE 23 JULY 98
MECH	J.MAGINN	DATE 30 JULY 98
ELEC	J.BANKERT	DATE 29 JULY 98

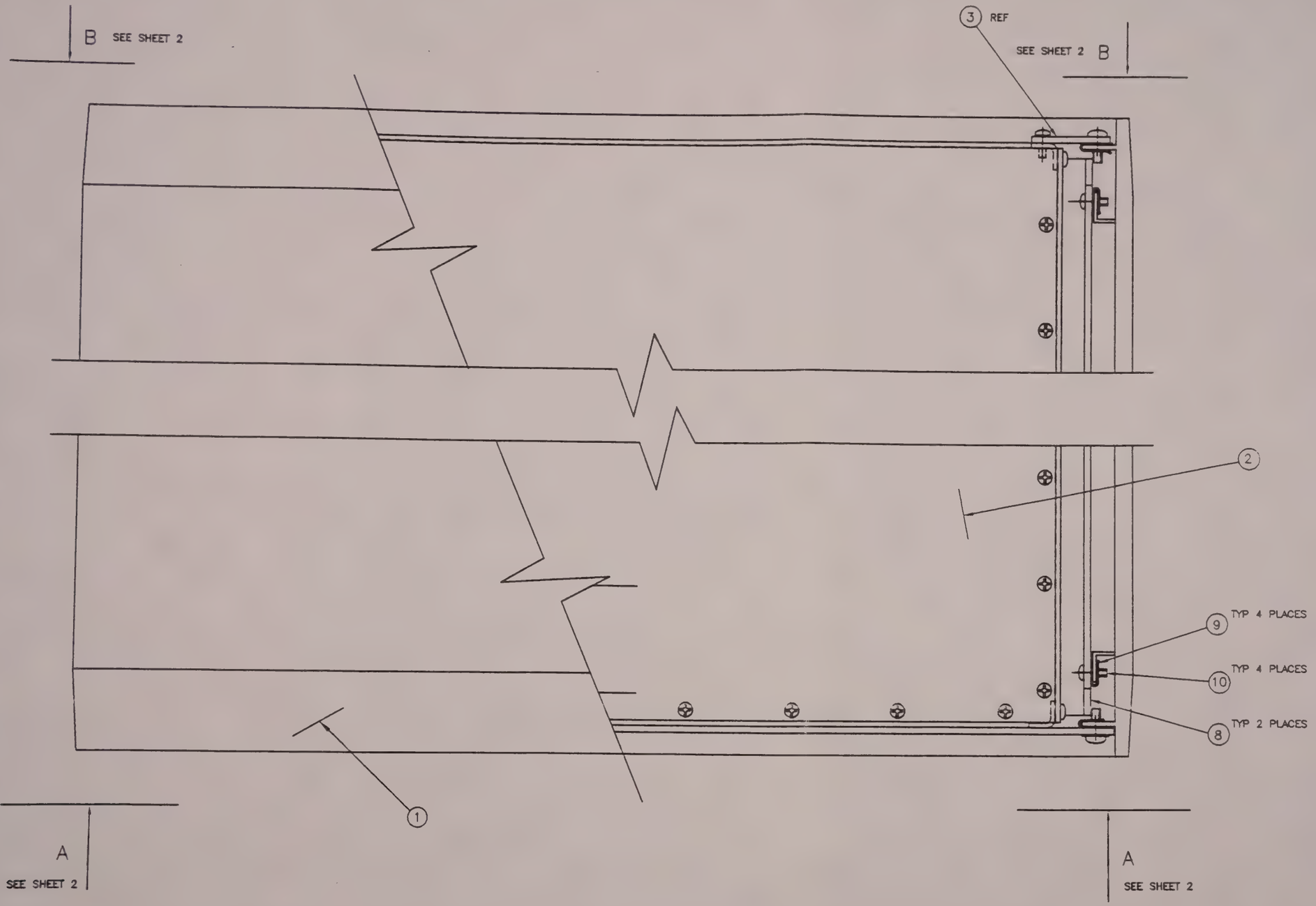
AMPLIFIER RESEARCH

BLOCK DIAG 25S1G4A

DWG. NO. 1009506

SCALE NONE SHEET

REV –



FOR BOM SEE 1009507-501

SHEET	1	2
REV	–	–

ITEM	QTY. REQD.	PART NO.	DESCRIPTION	MARK	FIN	MATL
		PARTS LIST				

UNLESS OTHERWISE SPECIFIED
DO NOT SCALE DRAWING
DIMENSIONS ARE IN INCHES AND INCLUDE PLATING THICKNESS
ALL THREADS ARE UNIFIED NATIONAL COARSE, CLASS 2
REMOVE ALL BURRS AND SHARP EDGES

BASIC DIMENSIONS	2 PLACE DECIMALS	3 PLACE DECIMALS
UP TO 6	±.02	±.005
ABOVE 6 TO 24	±.05	±.010
ABOVE 24	±.05	±.010
ANGULAR DIMENSIONS ±1°		

DRAWN: C. GWYNN, DATE 11 MAY 98
CHKD: M. BICKELMAN, DATE 27 JUL 98
MECH: DATE
ELEC: DATE

SUPERIOR RESEARCH

MODEL 25S1G4A

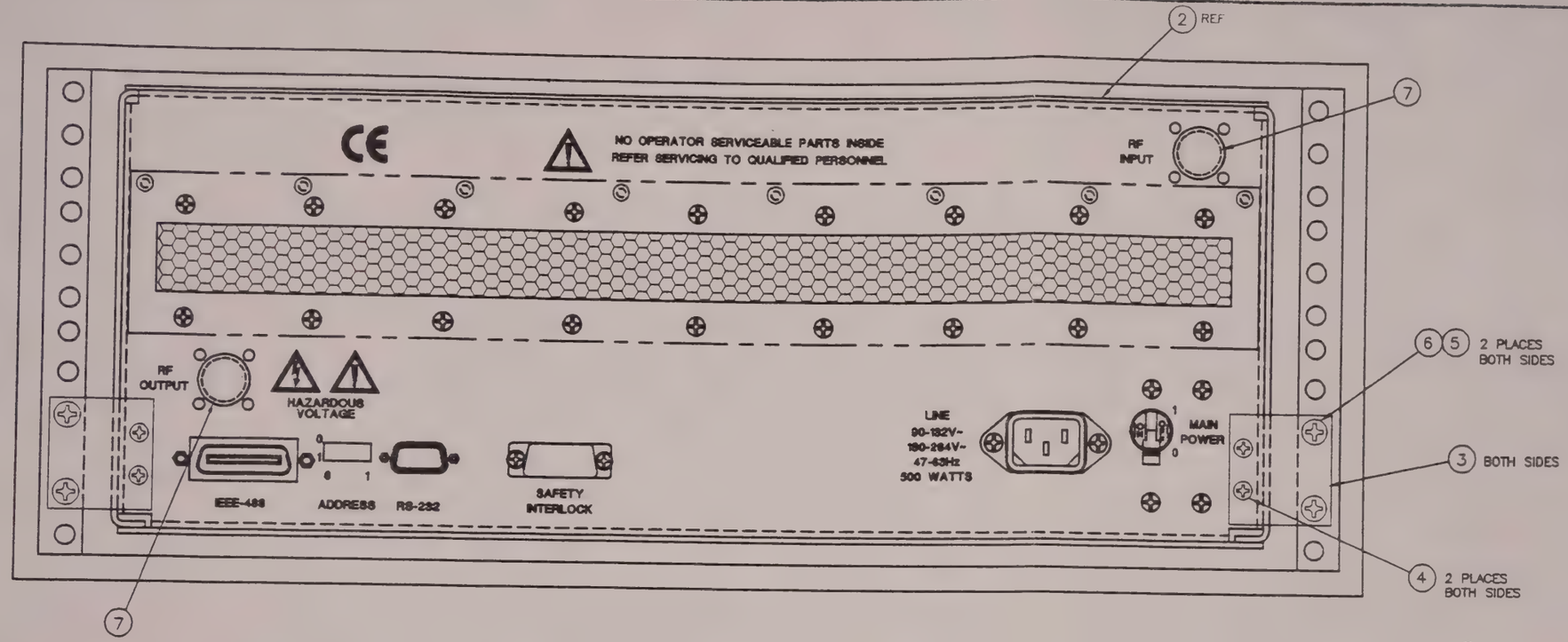
DWG. NO. 1009507

SCALE 1/1 SHEET 1 OF 2

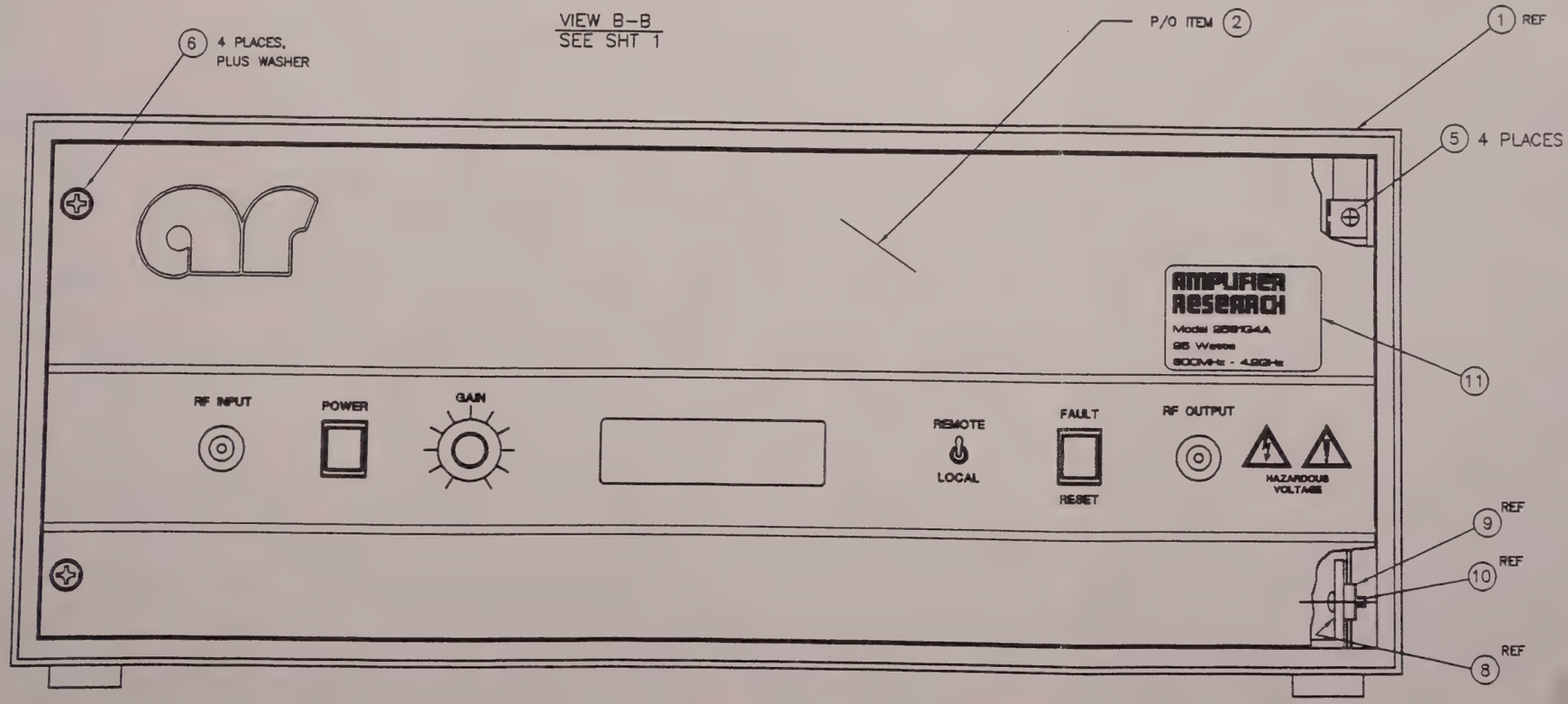
USED ON MODEL 25S1G4A

SEE BOM BLOCK

1176-01



VIEW B-B
SEE SHT 1



VIEW A-A
SEE SHT 1

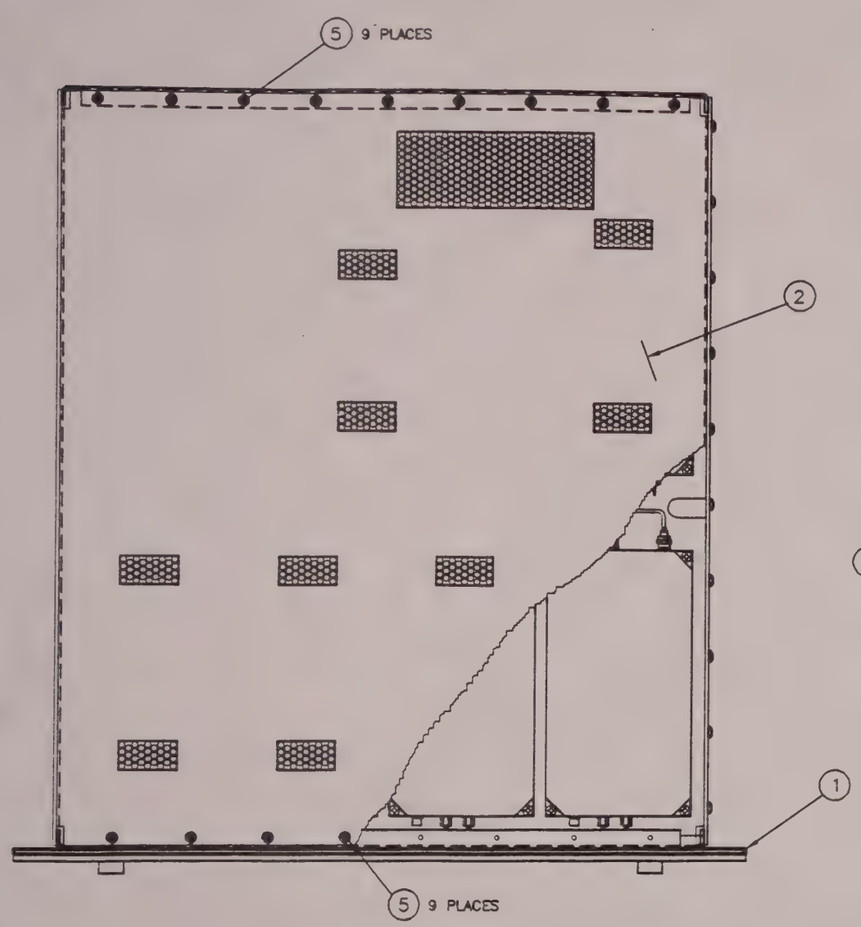
1009507

1/1 2 OF 2

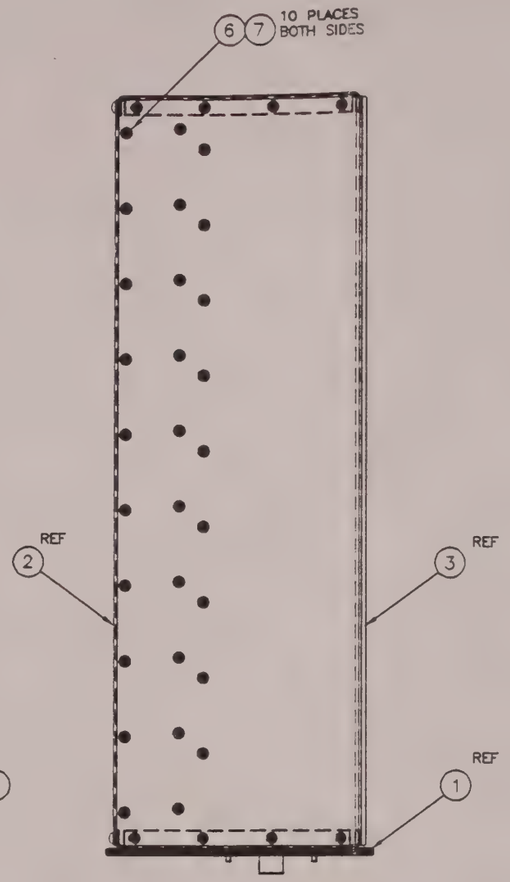
BILL NO: 1009507-501 REV: C U/M: EA DRAWING NO: ARC-D\1009507
MODEL 25S1G4A,25 WATTS,800MHz-4.2GHz

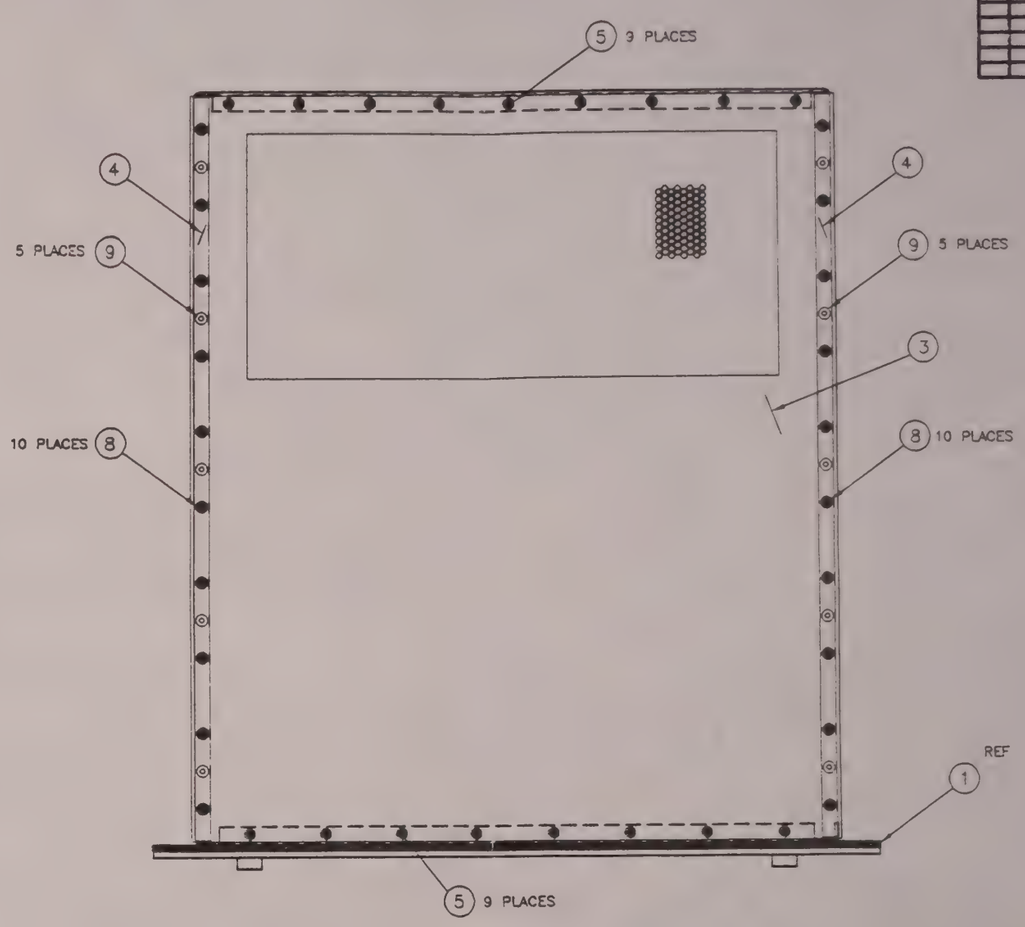
SEQ	PART NUMBER	REV	D E S C R I P T I O N	U/M	QUANTITY-PER	DRAWING NUMBER	REF-DSGN
0010	1009506	C	BLOCK DIAG,MODEL 25S1G4A	EA	REF	ARC-C\1009506	
0015	1009521-501		MANUAL,MODEL 25S1G4A	EA	4.000		
0020	1009507	-	ASSY DWG,MODEL 25S1G4A	EA	REF	ARC-D\1009507	
0100	1009661-501	-	ASSY,CONTROLLER,25S1G4A	EA	1.000		A14U2
5000	1001576-313	R	CABINET,INST CASE,PERF BOT PNL,7.00 H,19.94 D	EA	1.000	ARC-B\1001576	1
5010	1009508-501	-	FINAL AMP ASSY	EA	1.000	ARC-D\1009508	2
5020	1008142-101	A	BRKT,SHIPPING	EA	2.000	ARC-A\1008142	3
5030	11137		SCREW,MACH,PAN HD,CROSS-REC,S/ZN,6-32X.31,TYPE SW	EA	4.000		4
5040	14043		FASTENER,"U" TYPE,10B SCREW,PNL RANGE .125-.160	EA	8.000	ECO\C14810-102	5
5050	94027		SCREW,PNL,DECORATIVE,WITH NYLON WASH	EA	8.000	OPM\HW-1	6
5060	69111		PLUG,HOLE,METAL,5/8"DIA HOLE,13/16"O/A DIA	EA	2.000	HHS\654	7
5070	1008134-101	-	ANGLE,SUPPORT,SIDE	EA	2.000	ARC-B\1008134	8
5080	14000		FASTENER,TINNERMAN,C8121-101-4	EA	4.000	ECO\C8121-10-4	9
5090	11130		SCREW,MACH,HEX HD SLTD,S/ZN PLTG,#10 X.50,TYPE B	EA	4.000		10
5100	1007226-101-F1-M194	CE	PL,MODEL NO,25S1G4A	EA	1.000	ARC-A\1007226	11
5110	66147		PWR CORD,3 COND,18AWG,UNIV DTCH	EA	1.000	PAE\C3120-008-BL	

1176-01

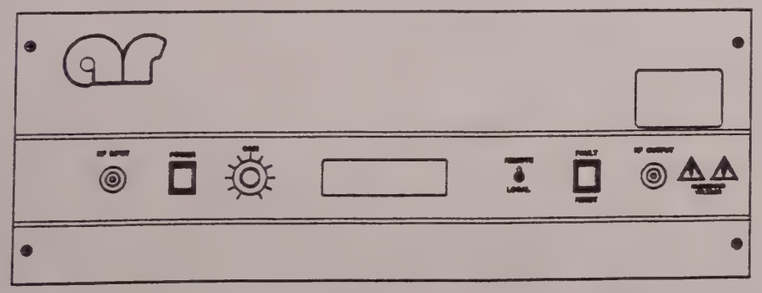


TOP VIEW





BOTTOM VIEW



FOR BOM SEE 1009508-501

ITEM	QTY. REQD.	PART NO.	DESCRIPTION	MARK	FIN	MAT
		PARTS LIST				

UNLESS OTHERWISE SPECIFIED
DO NOT SCALE DRAWING
DIMENSIONS ARE IN INCHES AND INCLUDE PLATING THICKNESS
ALL THREADS ARE UNIFIED NATIONAL STANDARD, CLASS 2
REMOVE ALL BURRS AND SHARP CORNERS

BASIC DIMENSIONS	2 PLACE DECIMALS	3 PLACE DECIMALS
UP TO 6	±.02	±.005
ABOVE 6 TO 24	±.03	±.010
ABOVE 24	±.06	±.015
ANGULAR TOLERANCES ±1/2°		

USED ON MODEL 7560-AA

DRAWN C. CRYNEN DATE 28 APR 98
CHKD M. BICKELMAN DATE 27 JUL 98
MECH DATE
ELEC DATE

AMPLIFIER RESEARCH

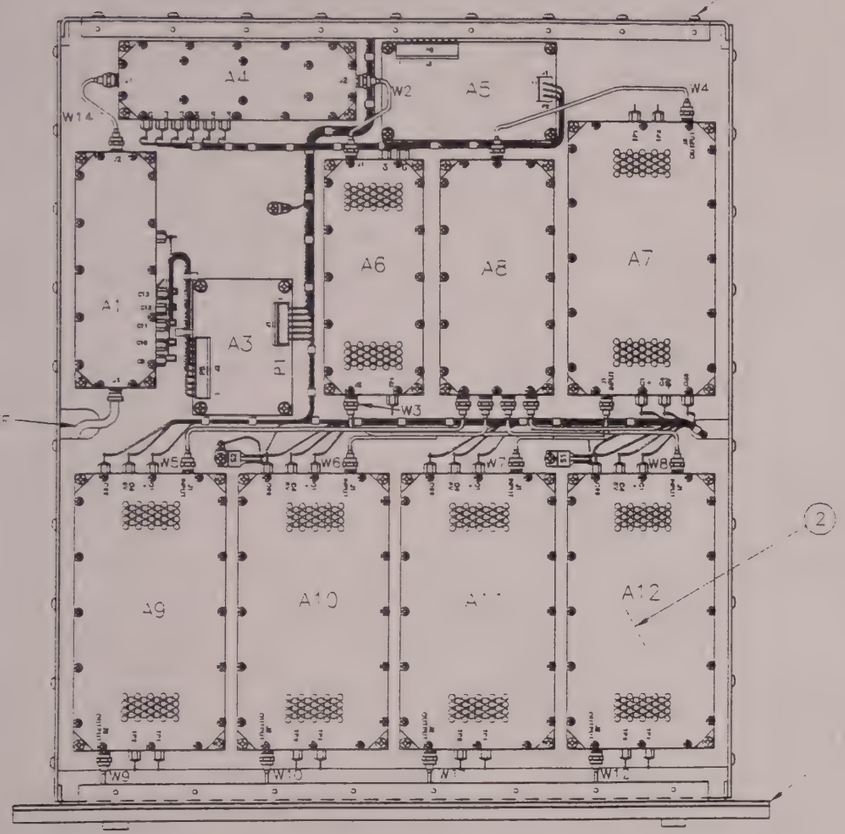
FINAL AMP ASSY

DWG. NO. 1009508

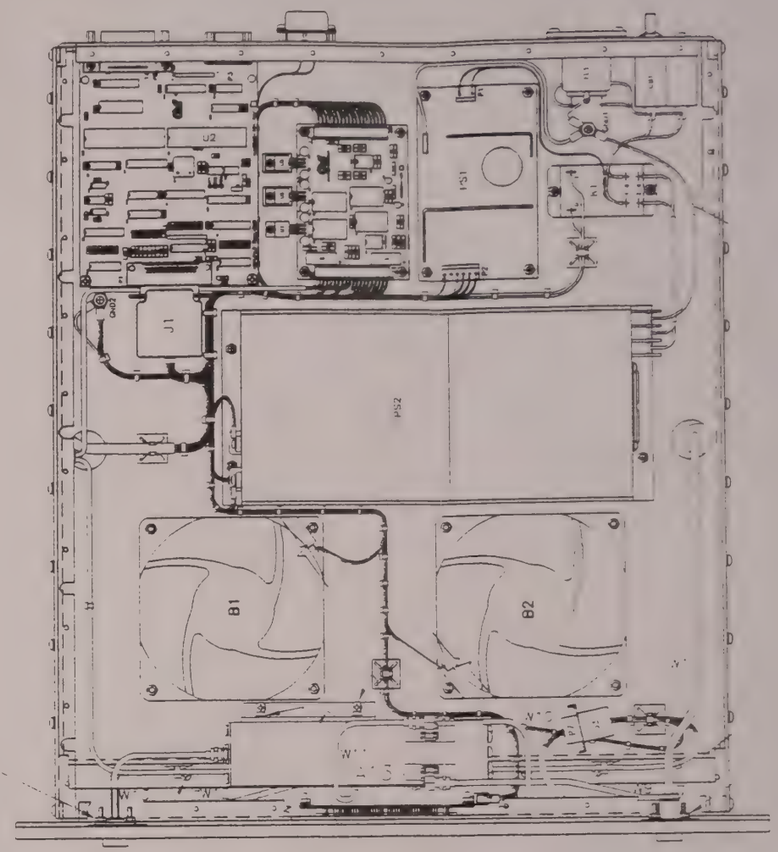
SCALE 1/2 SHEET 1 OF 1 REV —

BILL NO: 1009508-501 REV: - U/M: EA DRAWING NO: ARC-D\1009508
FINAL AMP ASSY

SEQ	PART NUMBER	REV	D E S C R I P T I O N	U/M	QUANTITY-PER	DRAWING NUMBER	REF-DSGN
0010	1009508	-	ASSY DWG,FINAL AMP ASSY	EA	REF	ARC-D\1009508	
5000	1009509-501	A	AMP ASSY	EA	1.000	ARC-D\1009509	1
5010	1008115-301	A	COVER,TOP	EA	1.000	ARC-D\1008115	2
5020	1008116-101	-	COVER,BOTTOM	EA	1.000	ARC-D\1008116	3
5030	1008138-101	-	GLIDE	EA	2.000	ARC-B\1008138	4
5040	11137		SCREW,MACH,PAN HD,CROSS-REC,S/ZN,6-32X.31,TYPE SW	EA	36.000		5
5050	11016		SCREW,MACH,PAN HD,CROSS-REC,S/S,6-32 X .38	EA	20.000	\MS51957-28	6
5060	12048		WASH,LOCK,SPLIT,S/S,#6	EA	20.000	\MS35338-136	7
5065	11018		SCREW,MACH,PAN HD,CROSS-REC,ZN,6-32 X .38,TYPE SW	EA	20.000		8
5070	69120		RIVET,GRIP-TITE,A,1/8"DIA,1/8-1/4"MAT'L THK	EA	10.000	GRA\5X520	9



TOP VIEW



BOTTOM VIEW

FOR BOM SEE 1009509-501

QTY. REQD.	PART NO.	DESCRIPTION	REV	F/N	MFG
	PARTS LIST				

UNLESS OTHERWISE SPECIFIED
DO NOT SCALE DRAWING
DIMENSIONS ARE IN INCHES AND INCLUDE PLATING THICKNESS
ALL THREADS ARE UNIFIED NATIONAL SERIES, CLASS 2
REMOVE ALL BURRS AND SHARP EDGES

BASIC DIMENSIONS	2 PLACE DECIMALS	3 PLACE DECIMALS
UP TO 6	±.02	±.008
ABOVE 6 TO 24	±.03	±.010
ABOVE 24	±.05	±.015

ANGULAR DIMENSIONS ±°

DRAWN	C. DWYNN
DATE	12 MAY 98
CHKD	M. BICKELMAN
DATE	28 JUL 98
MECH	J. MAGINN
DATE	30 JUL 98
ELEC	J. BANKERT
DATE	28 JUL 98

AMPLIFIER RESEARCH

AMP ASSY

DWG. NO. 1009509

SCALE | SHEET OF | REV

2555/04A

USED ON MODEL

BILL NO: 1009509-501 REV: A U/M: EA DRAWING NO: ARC-D\1009509
AMP ASSY

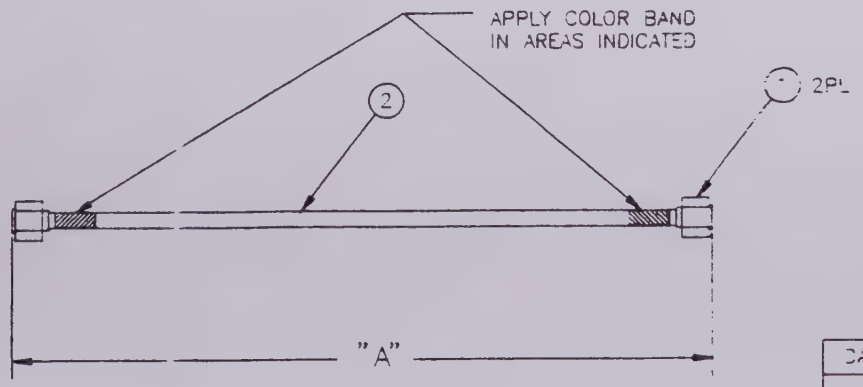
SEQ	PART NUMBER	REV	D E S C R I P T I O N	U/M	QUANTITY-PER	DRAWING NUMBER	REF-DSGN
0010	1009506	C	BLOCK DIAG,MODEL 25S1G4A	EA	REF	ARC-C\1009506	
0020	1009509	C	ASSY DWG,AMP ASSY	EA	REF	ARC-D\1009509	
0030	1009516	B	WIRE LIST,AMP ASSY	EA	REF	ARC-A\1009516	
0100	1008056-501	A	COMBINER ASSY,4 WAY	EA	1.000	ARC-C\1008056	A13
4200	20547	-	CABLE ASSY,COAX,SEMI-RIGID,N,BLKHD,SMA,15.0"	EA	1.000	ARC-A\1002494	W1
4220	20466	-	CABLE ASSY,COAX,SEMI-RIGID,SMA,SMA,8.3"	EA	1.000	ARC-A\1002494	W3
4230	20467	A	CABLE ASSY,COAX,SEMI-RIGID,SMA,SMA,7.5	EA	1.000	ARC-A\1002494	W4
4240	1008009-501	-	CABLE ASSY,COAX,SIMI-RIGID	EA	1.000	ARC-B\1008009	W5
4250	1008009-502	-	CABLE ASSY,COAX,SEMI-RIGID	EA	1.000	ARC-B\1008009	W6
4260	1008009-503	-	CABLE ASSY,COAX,SEMI-RIGID	EA	1.000	ARC-B\1008009	W7
4270	1008009-504	-	CABLE ASSY,COAX,SEMI-RIGID	EA	1.000	ARC-B\1008009	W8
4280	1008010-501	-	CABLE ASSY,COAX,SEMI-RIGID	EA	1.000	ARC-B\1008010	W9
4290	1008010-502	-	CABLE ASSY,COAX,SEMI-RIGID	EA	1.000	ARC-B\1008010	W10
4300	1008010-503	-	CABLE ASSY,COAX,SEMI-RIGID	EA	1.000	ARC-B\1008010	W11
4310	1008010-504	-	CABLE ASSY,COAX,SEMI-RIGID	EA	1.000	ARC-B\1008010	W12
4320	20468,	A	CABLE ASSY,COAX,SEMI-RIGID,N,BLKD,SMA,6.0"	EA	1.000	ARC-A\1002494	W13
4330	20469	B	CABLE ASSY,COAX,SEMI-RIGID,SMA,SMA,2.8"	EA	2.000	ARC-A\1002494	W14 ,W2
5000	1009510-501	C	PS ASSY	EA	1.000	ARC-D\1009510	1
5010	1009518-501	C	RF ASSY	EA	1.000	ARC-D\1009518	2
5020	11016		SCREW,MACH,PAN HD,CROSS-REC,S/S,6-32 X .38	EA	40.000	\MS51957-28	3
5030	12048		WASH,LOCK,SPLIT,S/S,#6	EA	42.000	\MS35338-136	4
5040	1008141-101	-	BRKT,COMBINER	EA	1.000	ARC-B\1008141	5
5050	11015		SCREW,MACH,PAN HD,CROSS-REC,S/S,6-32 X .31	EA	2.000	\MS51957-27	6
5060	12047		WASH,LOCK,SPLIT,S/S,#4	EA	8.000	\MS35338-135	7

BILL NO: 1009509-501 REV: A U/M: EA DRAWING NO: ARC-D\1009509
AMP ASSY

SEQ	PART NUMBER	REV	D E S C R I P T I O N	U/M	QUANTITY-PER DRAWING NUMBER	REF-DSGN
5070	13003		NUT,HEX,S/S,4-40,.187AF	EA	8.000	8

ECN	DATE	REV
–	11SEP96	–
REL	20SEP96	–

REL NO
*135-01



DASH NO.	DIM A	COLOR	REV	FOR BOM SEE
-501	8.50	BROWN	–	*C08009-501
-502	8.75	RED	–	*C08009-502
-503	9.00	ORANGE	–	*C08009-503
-504	9.25	YELLOW	–	*C08009-504

NOTES:

1.0 "A" DIM. IS CRITICAL WITHIN ±0.032.

2.0 APPLY COLOR BAND WITH A PAINT PEN.

3.0 CLEAN COAX BEFORE CONNECTOR INSTALLATION.

ITEM	PART NO.	DESCRIPTION	MARK	FIN	MAT'L
QTY. REQD.	PARTS LIST				

UNLESS OTHERWISE SPECIFIED
DO NOT SCALE DRAWING
DIMENSIONS ARE IN INCHES AND INCLUDE PLATING THICKNESS
ALL THREADS ARE UNIFIED NATIONAL SERIES, CLASS 2
REMOVE ALL BURRS AND SHARP EDGES

BASIC DIMENSIONS	2 PLACE DECIMALS	3 PLACE DECIMALS
UP TO 6	±.02	±.005
ABOVE 6 TO 24	±.03	±.010
ABOVE 24	±.06	±.015

ANGULAR DIMENSIONS ±1/2

DRAWN C. BOCKELMAN DATE 3 SEP 96
CHKD C. BOCKELMAN DATE 3 SEP 96
MFG: DATE
ENGR: DATE 29 Sep 96

DES'D ON MODEL
USED ON MODEL

AMPLIFIER RESEARCH

CABLE ASSY
COAX, SEMI RIGID

DWG NO. *C08009-XXX

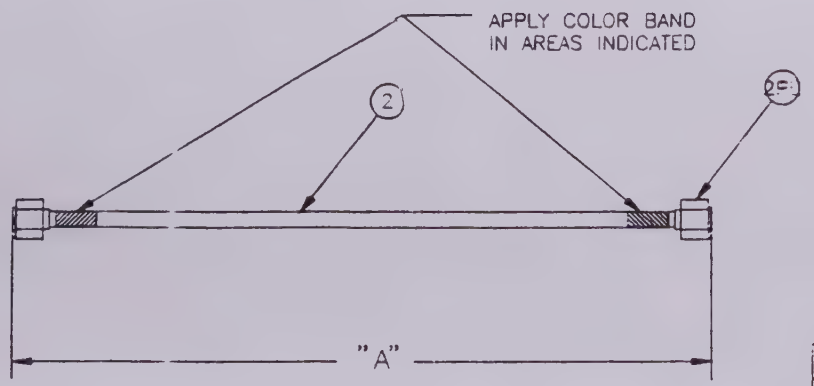
SCALE | SHEET 1 OF 1 | REV SEE BLOCK

BILL NO: 1008009-501 REV: - U/M: EA DRAWING NO: ARC-B\1008009
CABLE ASSY,COAX,SIMI-RIGID

SEQ	PART NUMBER	REV	D E S C R I P T I O N	U/M	QUANTITY-PER	DRAWING NUMBER	REF-DSGN
0010	1008009	-	ASSY DWG,CABLE ASSY	EA	REF	ARC-B\1008009	
5000	41162		CONN,SMA ST PLUG,SEMI-RIGID COAX	EA	2.000	AEP\9301-7063-009	1
5010	66208	-	WIRE,COAX,SEMI-RIGID,.141 AL-TP/M17 50 OHM	IN	A/R	EZF\810015	2

ECN	DATE	REV
–	11SEP96	–
REL	20SEP96	–

REL NC
1035-01



DASH NO.	DIM A	COLOR	REV	FOR BOM SEE
-501	8.25	BROWN	–	1008010-501
-502	8.00	RED	–	1008010-502
-503	7.75	ORANGE	–	1008010-503
-504	7.50	YELLOW	–	1008010-504

NOTES:

1.0 "A" DIM IS CRITICAL WITHIN ±0.032.

2.0 APPLY COLOR BAND WITH A PAINT PEN.

3.0 CLEAN COAX BEFORE CONNECTOR INSTALLATION.

ITEM	PART NO.	DESCRIPTION	MARK	REV	MAT
QTY. REQD.	PARTS LIST				

UNLESS OTHERWISE SPECIFIED
DO NOT SCALE DRAWING
DIMENSIONS ARE IN INCHES AND INCLUDE PLATING THICKNESS
ALL THREADS ARE UNIFIED NATIONAL SERIES, CLASS 2.
REMOVE ALL BURRS AND SHARP EDGES

BASIC DIMENSIONS	2 PLACE DECIMALS	3 PLACE DECIMALS
UP TO 6	±.02	±.005
ABOVE 6 TO 24	±.03	±.010
ABOVE 24	±.06	±.015

ANGULAR DIMENSIONS 1/2°

DRAWN C. BICKELMAN DATE 10 SEP 96
CHKD C. BICKELMAN DATE 11 SEP 96
MECH J. Maupin DATE 4/Aug 96
ELEC F. Schink DATE 24 Sept.

AMPLIFIER RESEARCH

CABLE ASSY
COAX, SEMI RIGID

DWG NO. 1008010-XXX

SCALE SHEET OF REV SEE BLOCK

USED ON MODEL

BILL NO: 1008010-501 REV: - U/M: EA DRAWING NO: ARC-B\1008010
CABLE ASSY,COAX,SEMI-RIGID

SEQ	PART NUMBER	REV	D E S C R I P T I O N	U/M	QUANTITY-PER	DRAWING NUMBER	REF-DSGN
0010	1008010	-	ASSY DWG,CABLE ASSY	EA	REF	ARC-B\1008010	
5000	41162		CONN,SMA ST PLUG,SEMI-RIGID COAX	EA	2.000	AEP\9301-7063-009	1
5010	66208	-	WIRE,COAX,SEMI-RIGID,.141 AL-TP/M17 50 OHM	IN	A/R	EZF\810015	2

ECN	DATE	
1354		

A9
A10
A11
A12
A1
A3
A6
A8
A7
A4
A5
P2
S1
S2
P5
P6
P1
P0
J1
J2
C1
C4 -5V
C28
TP1
TP2
INPUT
OUTPUT
C3
C5
C6
C7
C8
C9
C10
C11
C12
C13
C16

5 11
12
3 4
4 PLACES
5 4 6 7
4 PLACES
5 11
2 4
4 PLACES
3 4
4 PLACES
13
2 4 6
4 PLACES
5 4 6 7
4 PLACES
1
2 4
4 PLACES
2 4
4 PLACES
5 4
2 4
4 PLACES

FOR BOM SEE 1009518-50*

ITEM	QTY. REQD.	PART NO.	DESCRIPTION	MARK	FIN	MATL
		PARTS LIST				

UNLESS OTHERWISE SPECIFIED
DO NOT SCALE DRAWING
DIMENSIONS ARE IN INCHES AND
MILLIDEC PLATING THICKNESS
ALL THREADS ARE UNIFIED NATIONAL
SCROL CLASS 2
REMOVE ALL BURRS AND SHARP
EDGES

SIZE	DIMENSIONS	2 PLACE DECIMALS	3 PLACE DECIMALS
	UP TO 6	0.02	0.005
	OVER 6 TO 30	0.05	0.010
	OVER 30	0.10	0.015

DRAWN: C. GWYNN, DATE 28 APR 98
CHKD: W. BICKELMAN, DATE 27 JUL 98
MECH: J. MAGINN, DATE 30 JUL 98
ELEC: J. SANCERT, DATE 28 JUL 98

AMPLIFIER RESEARCH

RF ASSY

DRG. NO. 1009518

SCALE 1/1 SHEET , OF , REV. D

2551C4A
USED ON MODEL

BILL NO: 1009518-501 REV: C U/M: EA DRAWING NO: ARC-D\1009518
RF ASSY

SEQ	PART NUMBER	REV	D E S C R I P T I O N	U/M	QUANTITY-PER	DRAWING NUMBER	REF-DSGN
0010	1009518	B	ASSY DWG,RF ASSY	EA	REF	ARC-D\1009518	
0100	1008810-501	C	PWB ASSY,VARIABLE GAIN AMP/DET	EA	1.000	ARC-D\1008810	A1
0120	1007454-501	H	PWB ASSY,LINEARIZER/CTRL BD	EA	1.000	ARC-B\1007454	A3
0130	1010589-501	A	PWB ASSY,LOW LEVEL "S" MODULE	EA	1.000	ARC-A\1010589	A4
0140	1010748-501	B	PWB ASSY,BIAS CTRL,1W S MODULE	EA	1.000	ARC-C\1010748	A5
0150	1009542-501	B	4 WATT AMP ASSY	EA	1.000	ARC-C\1009542	A6
0160	1009161-501	J	PWB ASSY,QUAD AMP,100S1G4	EA	5.000	ARC-A\1009161	A7 ,A9 A10 ,A11 A12
0170	1010072-501	A	PWB ASSY,4 WAY SPLITTER #3	EA	1.000	ARC-C\1010072	A8
3100	57062		SW,TEMP SENSING,N.C.,OPEN AT 70C	EA	2.000	AIR\67L070	S1 ,S2
5000	1008110-301	A	HEATSINK	EA	1.000	ARC-D\1008110	1
5010	11025		SCREW,MACH,PAN HD,CROSS-REC,S/S,6-32 X 1.50	EA	28.000	\MS51957-36	2
5020	11024		SCREW,MACH,PAN HD,CROSS-REC,S/S,6-32 X 1.25	EA	8.000	\MS51957-35	3
5030	12048		WASH,LOCK,SPLIT,S/S,#6	EA	45.000	\MS35338-136	4
5040	11016		SCREW,MACH,PAN HD,CROSS-REC,S/S,6-32 X .38	EA	11.000	\MS51957-28	5
5050	12024		WASH,FLAT,B/ZN PLTG,.312 OD X .164 ID X .125 THK	EA	12.000	\S785-M01-F21-.164	6
5060	12011		WASH,FLAT,S/S,#6,.312 OD X .156 ID X .035 THK	EA	8.000	\MS15795-805	7
5100	69100		LUG,SHAKEPROOF,BENT,41/64 L,#6 STUD,DUAL HOLE	EA	2.000	HHS\1416-6	11
5110	1008321-501	-	HARNESS ASSY,PRE-AMP\LEVELER	EA	1.000		12
5120	1008322-501	A	HARNESS ASSY,1 WATT AMP	EA	1.000		13

POWER IN FROM CONTROL PANEL

J1 — C2 15pf — U1 AT-202 — L1 — R2 27 — C5 1000pf — R3 27K — R4 27K — L2 — C6 1000pf — C3 15pf — R14 1K — R5 1K — C7 1000pf — Q1 — R1 270, 1/8W — C1 1000pf — C4 1000pf — L4 — C8 1000pf

A1
SCHEMATIC
REFERENCE
1008812

R6 120,1/8W — R7 220,1/8W — R8 270,1/8W — U2 GND — L5 C17 10pf R11 10,1/8W — L6 C18 3.9pf R12 39,1/8W — U3 GND — J2

SELECT OR OMIT AT TEST

R10 150, 1/8W — R13 50 1/8W — CR1 — C14 68pf — C15 68pf — R9 50 — C16 470pf

C10 2500pf — C9 2500pf — C11 2500pf — C12 2500pf — C13 2500pf

P5 — J2 — -1.5V

P5 — J2

A3
SCHEMATIC
REFERENCE
1007392

R3 1.5K — R36 1K — C4 0.1 -15V — R1 10K — U1/A MC1558U — R2 1K — -3.0V

CONTROL IN — J1-6 -12.7V — R4 47K

+15V — C2 0.1 — R5 100K

+15V — J1-5 — R6 56K — Q2 2N3904 — R7 27K

-15V — J1-4 — R8 8.2K -2.9V — R9 2.0K

C3 0.1 -15V — Q3 2N3904 — R10 8.2K

R11 10K -3.7V — R12 3.3K

GND — J1-1

Q4 2N3904 — R13 2.2K

J1-3

R14 10K -3.9V — R15 3.6K

-3.9V

R19 10K — R18 10K -0.1V — U1/B MC1558U — R17 3.3K -12.6V

R21 10K — R20 10K -0.1V

-15V — R22 56

R16 1.5K

R23 15K -15V — R24 3.9K — Q1 2N3906 — R27 220,1W

C9 0.22 — R25 3.3K 3.7V — R26 10K

C6 0.1

4.3V — +15V

R37 22K — C10 220pf — R28 330K — C8 0.1 -15V

R30 22K — U2/A MC1558U — R29 10K — U2/B MC1558U -12.7V — R31 100 — J1-2

+15V — R32 12.1K — R33 10K — R34 100K — C7 0.1 — C1 0.01 — R35 10K

P/O CONTROL PANEL

10K — 12K — TO CONTROL IN

VOLTAGE READINGS @ MAX RF GAIN
POWER IN <-10dBm

ECN	DATE	DR.
XXXX	3.13.97	-
XXXX	3.24.97	-
REL	3.24.97	-
10081	3.31.1997	A

ITEM	QTY. REQD.	PART NO.	DESCRIPTION	MARK	FIN	MATL
		PARTS LIST				

UNLESS OTHERWISE SPECIFIED
DO NOT SCALE DRAWING
DIMENSIONS ARE IN INCHES AND INCLUDE PLATING THICKNESS
ALL THREADS ARE UNIFIED NATIONAL SCREW, CLASS 2
REMOVE ALL BURRS AND SHARP EDGES

DECIMALS	2 PLACE DECIMALS	3 PLACE DECIMALS
.XX	±.03	±.020
.XXX	±.03	±.010
.XXXX	±.03	±.005

DRAWN J.H.REED DATE 07 JULY 97
CHKD J.H.REED DATE 28 AUG 97
MECH J.MAGINN DATE 20 NOV 97
ELEC F.SCHIRK DATE 20 NOV 97

5051G4
USED ON MODEL

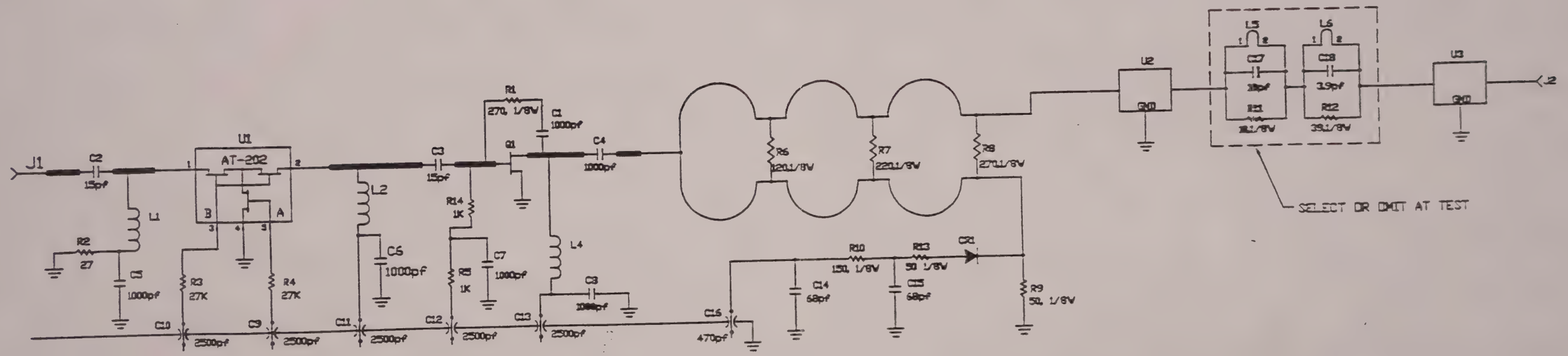
AMPLIFIER RESEARCH

SCHEMATIC
VAR.GAIN/PROT.CIR.

DWG. NO. 1008816

SCALE NONE — SHEET 1 OF 1 — REV. A

NOTICE TO PERSONS RECEIVING THIS DRAWING: THIS DRAWING IS THE PROPERTY OF AMPLIFIER RESEARCH AND IS NOT TO BE COPIED, USED, OR DISCLOSED, EXCEPTED OR LIMITED AS AGREED IN WRITING BY OR ON BEHALF OF ANY PERSON WITHOUT PRIOR WRITTEN CONSENT OF AMPLIFIER RESEARCH.



NOTES:

1. UNLESS OTHERWISE INDICATED, ALL RESISTORS ARE IN OHMS.

2. ALL CAPACITORS ARE IN MICROFARADS AND ARE 50 VOLTS UNLESS INDICATED.

REFERENCE DESIGNATION TABLE						
LAST DESIGNATION USED						
U3	CR1	L6	Q1	C18	J2	R12
DESIGNATIONS NOT USED						
		L3				

ITEM	QTY. REQD.	PART NO.	DESCRIPTION	MATERIAL
		PARTS LIST		

DRAWN	JJURGED
CHKD	JJURGED
MFG	
QUAL	
ENGR	

MINIMUM RESEARCH

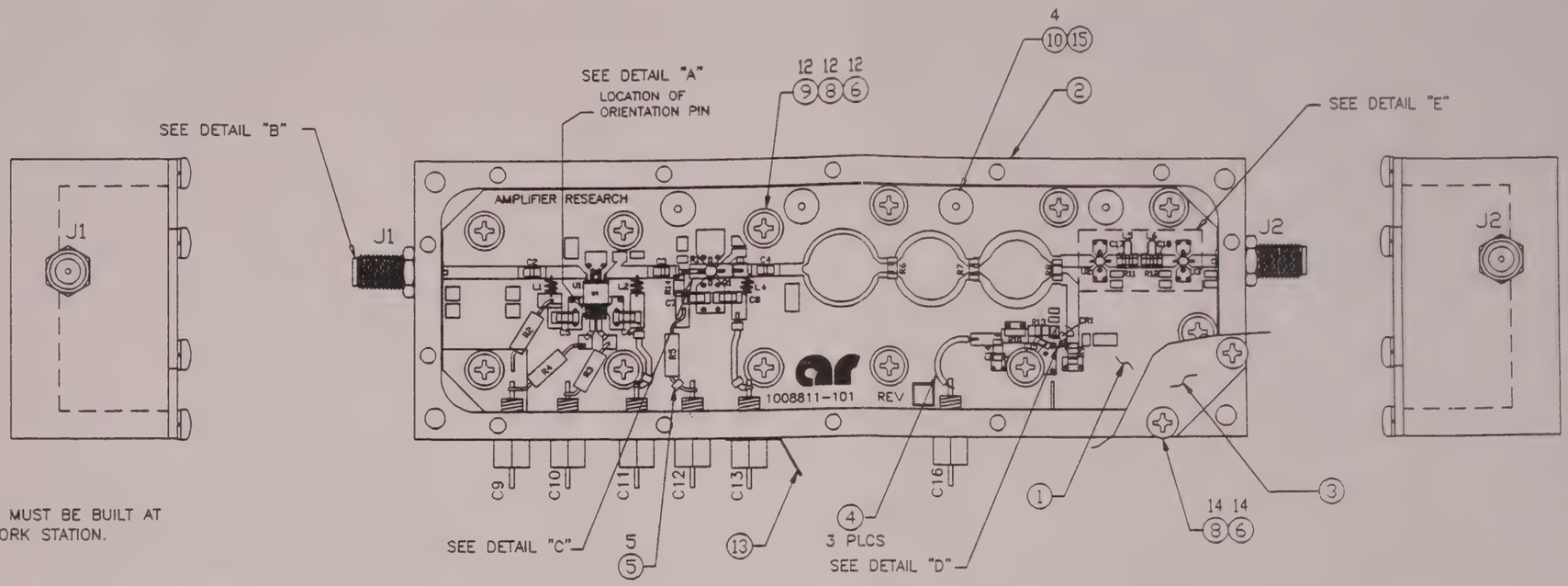
SCHEMATIC
VARIABLE GAIN AMP_DET

DWG NO. 1008812

SCALE 1/1 SHEET

NOTICE TO PERSONS RECEIVING THIS DOCUMENT.
THIS DOCUMENT IS THE PROPERTY OF AMPLIFIER RESEARCH AND THE IDEAS CONTAINED HEREIN SHALL BE MAINTAINED IN STRICT CONFIDENCE, AND NOT DISCLOSED, COPIED OR USED FOR MANUFACTURING OR SALE OF ANY PRODUCT WITHOUT PRIOR WRITTEN CONSENT OF AMPLIFIER RESEARCH.

ECN	DATE	
XXXX	26AUG97	
XXXX	29AUG97	
XXXX	30OCT97	
P.F.	2NOV97	
9253	07JAN98	
9300	30JAN98	
9545	10AUG98	
10041	21JUN99	
10483	29MAR00	



THIS ENTIRE ASSEMBLY MUST BE BUILT AT A STATIC APPROVED WORK STATION.

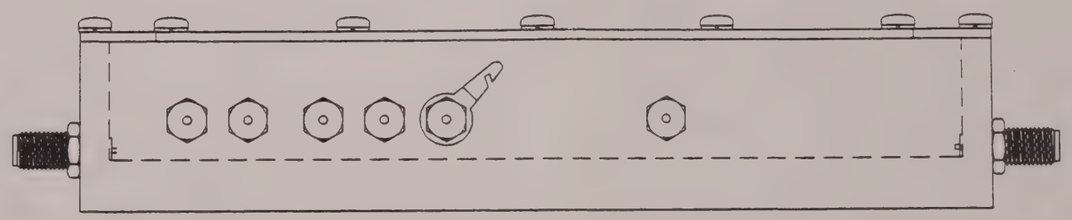
ASSEMBLY PROCEDURE
VARIABLE GAIN AMP

1) INSTALL U1 TO P.C. BOARD. SOLDER 3 MIL. THICK TINNED BRASS FROM BOTTOM OF U1 TO GROUND PLANE. U1 INSTALLATION MUST BE DONE AT A STATIC APPROVED WORK STATION. SEE DETAIL "A".
2) INSTALL P.C. BOARD INTO HOUSING.
3) INSTALL J1 AND J2. PREPARE J1 AND J2 ACCORDING TO DIMENSIONS SHOWN IN DETAIL "B".
4) INSTALL FEEDTHRU C9 TO C13 INTO HOUSING.
5) INSTALL ALL OF THE CERAMIC CHIP CAPS EXCEPT C1, C17, C18.
6) INSTALL L1 THRU L4.
7) INSTALL R2 TO P.C. BOARD, KEEP LENGTHS AS SHORT AS POSSIBLE.
8) INSTALL R3 THRU R5 AND ITEM #4 (22 AWG SOLID WHITE WIRE) BETWEEN FEEDTHRU AND P.C. BOARD. CUT LEADS AS SHORT AS POSSIBLE.

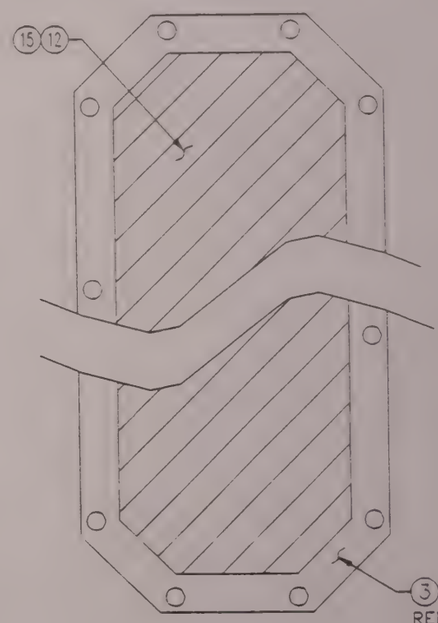
NOTE: FET INSTALLATION MUST BE DONE AT A STATIC APPROVED WORK STATION. PERSONS MUST BE FAMILIAR WITH THE PROCEDURES. THE FET CAN BE DESTROYED EASILY BOTH ELECTRONICALLY AND MECHANICALLY.

FET INSTALLATION:

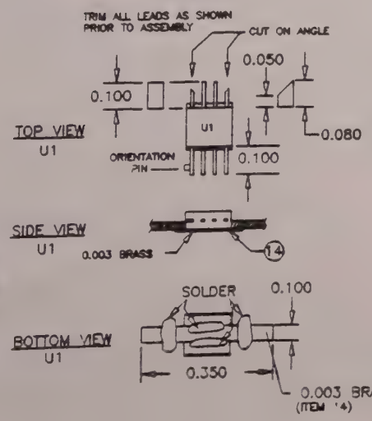
1) WITH A GROUNDED SOLDERING IRON, SOLDER Q1 INTO THE CIRCUIT.
2) INSTALL CHIP CAP C1 AS SHOWN IN DETAIL "C".
3) INSTALL RESISTOR R1 AS SHOWN IN DETAIL "C".
4) ITEMS C17, C18, R11, R12, L5, L6, U2, AND U3, WILL BE INSTALLED OR OMITTED AT TEST.



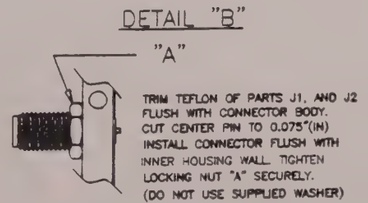
BOTTOM VIEW – COVER



DETAIL "A"

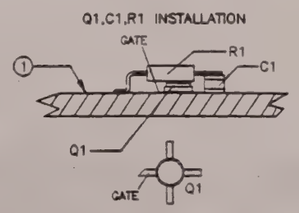


DETAIL "B"



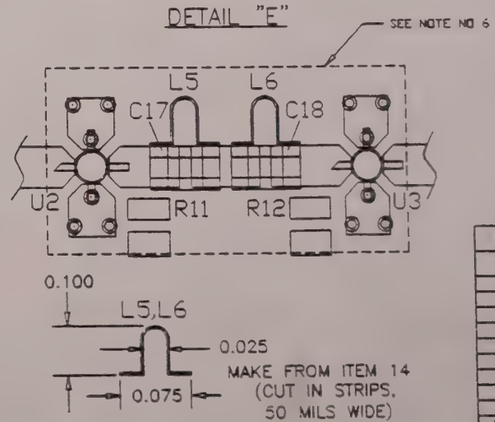
TRIM TEFLON OF PARTS J1, AND J2 FLUSH WITH CONNECTOR BODY. CUT CENTER PIN TO 0.075"(IN) INSTALL CONNECTOR FLUSH WITH INNER HOUSING WALL. TIGHTEN LOCKING NUT "A" SECURELY. (DO NOT USE SUPPLIED WASHER)

DETAIL "C"



DETAIL "D"

DETAIL "E"



FOR BOM SEE: 1008810-501

ITEM QTY. REQD.	PART NO.	DESCRIPTION	MARK	FIN	MATL
	PARTS LIST				

UNLESS OTHERWISE SPECIFIED DO NOT SCALE DRAWING. DIMENSIONS ARE IN INCHES AND INCLUDE PLATING THICKNESS. ALL THREADS ARE UNIFIED NATIONAL SERIES, CLASS 2. REMOVE ALL BURRS AND SHARP EDGES.

ANGLES	3 PLACE DECIMALS	3 PLACE DECIMALS
UP TO 6	±.02	±.008
ABOVE 6 TO 24	±.03	±.010
ABOVE 24	±.05	±.015

MANUFACTURING TOLERANCES 1/2°

DRAWN J.H.REED DATE 06 JUNE 97
CHKD J.H.REED DATE 10 JULY 97
MECH J.MAGINN DATE 21 NOV 97
ELEC F.SCHIRK DATE 20 NOV 97

AMPLIFIER RESEARCH

ASSEMBLY DRAWING
VARIABLE GAIN AMP/DET.

DWG. NO. 1008810

SCALE 2/1 SHEET 1 OF 1 REV. E

5051G4
USED ON MODEL

BILL NO: 1008810-501 REV: C U/M: EA DRAWING NO: ARC-D\1008810
PWB ASSY,VARIABLE GAIN AMP/DET

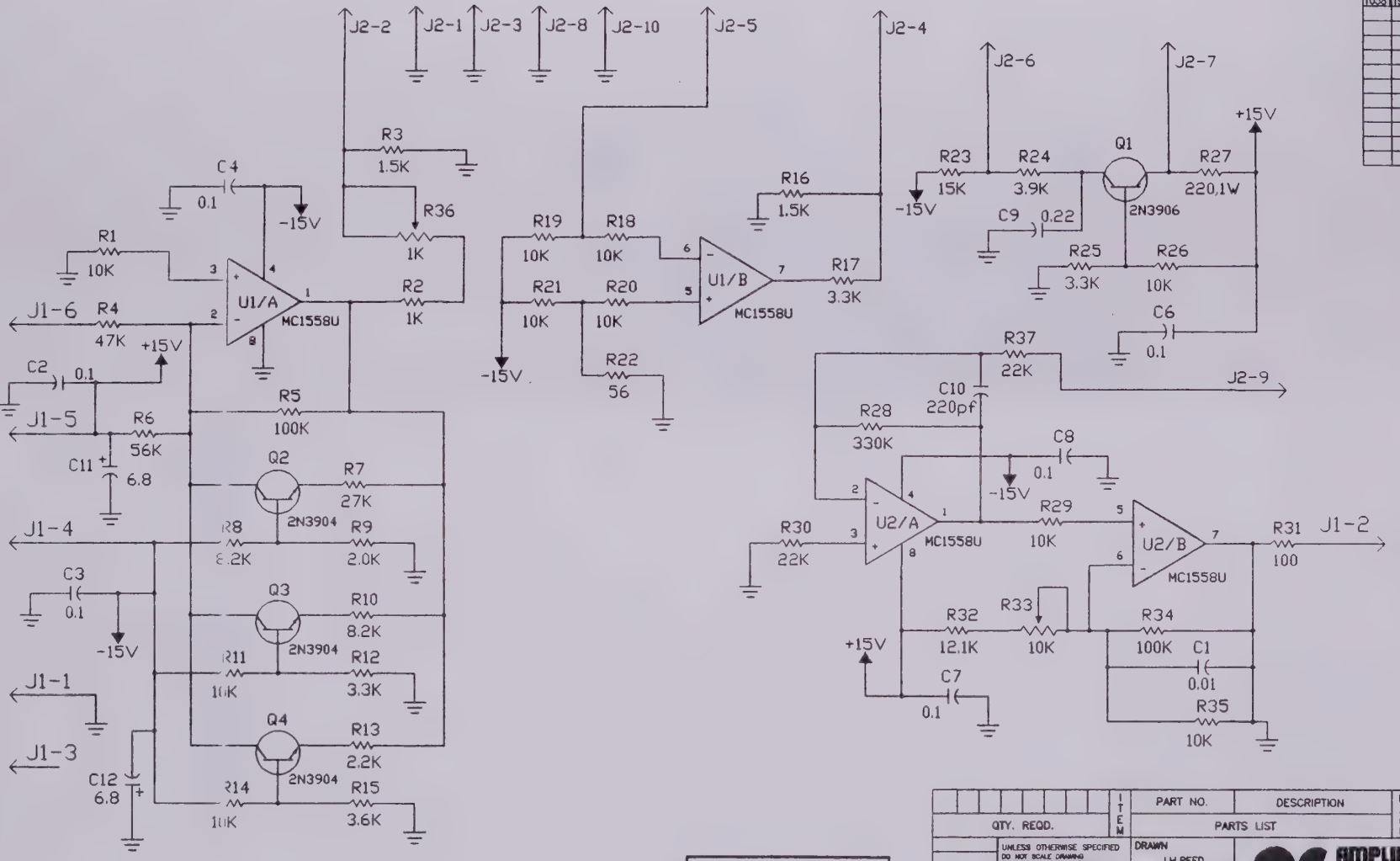
SEQ	PART NUMBER	REV	D E S C R I P T I O N	U/M	QUANTITY-PER	DRAWING NUMBER	REF-DSGN
0010	1008812	-	SCHEM DIAG,VARIABLE GAIN AMP/DET	EA	REF	ARC-D\1008812	
0020	1008810	E	ASSY DWG,VARIABLE GAIN AMP/DET	EA	REF	ARC-D\1008810	
0400	27039		CAPR,CHIP,CER,1000pF,10%,50V	EA	6.000	ATC\700B102MCA50X	C1 ,C4 C5 ,C6 C7 ,C8
0410	27031		CAPR,CHIP,15pF,20%,500V	EA	2.000	DIL\C17AH150MATXL	C2 ,C3
0420	27099		CAPR,FEED-THRU,FILT,2500PF,500V	EA	5.000	MET\51-719-011	C9 ,C10 C11 ,C12 C13
0430	27261		CAPR,CHIP,68pF,10%,150V	EA	2.000	ATC\100A680KCA150X	C14 ,C15
0440	27098		CAPR,FEED-THRU,FILT,470PF,10%	EA	1.000	MET\FB2B-471GMV	C16
0450	27029		CAPR,CHIP,10pF,10%,500V	EA	REF	DIL\C17AH100K4TXL	C17
0460	27259		CAPR,CHIP,CER,3.9pF,500V	EA	REF	ATC\100B3R9CP500X	C18
0700	30039		DIODE,SCHOTTKY,DET,MICRO-WAVE	EA	1.000	H-P\5082-2794	CR1
1500	41243		CONN,COAX,BULKHD JACK,SMA,(F)	EA	2.000	DTA\1321000K82165	J1 ,J2
1800	1007507-101	-	INDUCTOR,AIR WOUND,.050ID,34GA,4T	EA	2.000	ARC-A\1007507	L1 ,L4
1810	1007507-103	-	INDUCTOR,AIR WOUND,.050ID,34GA,7T	EA	1.000	ARC-A\1007507	L2
2500	1000034-176	BG	XSTR,RF,LOW NOISE,GaAsFET	EA	1.000	ARC-A\1000034	Q1
2700	55511-2700J		RES,FXD,CARBON COMP,270,5%,1/8W	EA	1.000	A-B\BB2715	R1
2710	55512-27R0J		RES,FXD,CARBON COMP,27,5%,1/4W	EA	1.000	A-B\CB2705	R2
2720	55612-2702J		RES,FXD,METAL FILM,27K,5%,1/4-1/2W	EA	2.000	TRW\GP55-2702+/-5%	R3 ,R4
2730	55612-1001J		RES,FXD,METAL FILM,1K,5%,1/4-1/2W	EA	1.000	TRW\GP55-1001+/-5%	R5
2740	55647-1200J		RES,FXD,CHIP,120,5%,1/8W	EA	1.000	D-K\P120-ECT-ND	R6
2750	55647-2200J		RES,FXD,CHIP,220,5%,1/8W	EA	1.000	D-K\P220-ECT-ND	R7
2760	55647-2700J		RES,FXD,CHIP,270,5%,1/8W	EA	1.000	D-K\P270-ECT-ND	R8
2770	55647-51R0J		RES,FXD CHIP,51 OHM,1/8W,5%	EA	2.000	D-K\ P51-ECT-ND	R9 ,R13

BILL NO: 1008810-501 REV: C U/M: EA DRAWING NO: ARC-D\1008810
PWB ASSY,VARIABLE GAIN AMP/DET

SEQ	PART NUMBER	REV	D E S C R I P T I O N	U/M	QUANTITY-PER	DRAWING NUMBER	REF-DSGN
2780	55511-1500J		RES,FXD,CARBON COMP,150,5%,1/8W	EA	1.000	A-B\BB1515	R10
2790	55647-10R0J		RES,FXD,CHIP,10,5%,1/8W	EA REF		D-K\P10-ECT-ND	R11
2800	55647-39R0J		RES,FXD,CHIP,39,5%,1/8W	EA REF		D-K\P39-ECT-ND	R12
2810	55647-1001J		RES,FXD,CHIP,1K,1/8,5%	EA	1.000	D-K\P1.0K-ECT-ND	R14
3700	25035		ATTEN,V VAR,DC-5 GHZ	EA	1.000	ANZ\AT-202	U1
3710	25054	-	ATTEN,FXD,3dB,1W,70 MIL PKG	EA	1.000	MIN\PAT-3	U2
3720	25069		ATTEN,FXD,2dB,1W,70 MIL PKG	EA	1.000	MIN\PAT-2	U3
5000	1008811-101	A	PWB,VARIABLE GAIN AMP/DET	EA	1.000	ARC-C\1008811	1
5010	1008813-101	A	HSG,VARIABLE GAIN AMP/DET	EA	1.000	ARC-D\1008813	2
5020	1007432-101	-	COVER,1 WATT AMP	EA	1.000	ARC-B\1007432	3
5030	66035		WIRE,TFE,22 AWG,SOLID WHT	IN A/R		WEI\2822	4
5040	1000643-401	C	CORE,FERRITE,BEAD	EA	5.000	ARC\1000643	5
5050	11010		SCREW,MACH,PAN HD,CROSS-REC,S/S,4-40 X .25	EA	26.000	\MS51957-13	6
5070	12047		WASH,LOCK,SPLIT,S/S,#4	EA	26.000	\MS35338-135	8
5080	12010		WASH,FLAT,S/S,#4,.250 OD X .125 ID X .022 THK	EA	12.000	\MS15795-803	9
5090	1000643-402	C	CORE,FERRITE,BEAD,CMD5005	EA	4.000	ARC\1000643	10
5110	69332		FOAM,CONDUCTIVE	IN A/R		MMM\2802	12
5120	69101		LUG,SOLDER,BENT TONGUE,3/4 L,3/8 OD,1/4 STUD	EA	1.000	HHS\1496	13
5130	77144	-	SHIM,BRASS,6.00X.003 THK (ROLL 100")	IN	2.000	MSS\00051037	14
5140	77066		ADH,RTV,SELF-LVL,CLEAR	OZ A/R		G-E\GE118	15

NOTICE TO PERSONS RECEIVING THIS DOCUMENT:
THIS DOCUMENT IS THE PROPERTY OF AMPLIFIER RESEARCH AND THE IDEAS CONTAINED HEREIN, SHALL BE MAINTAINED IN STRICT CONFIDENCE, AND NOT DISCLOSED, COPIED OR USED FOR MANUFACTURING OR SALE OF ANY PRODUCT WITHOUT PRIOR WRITTEN CONSENT OF AMPLIFIER RESEARCH.

ECN	DATE	REV
-	30JUN95	1
-	14AUG95	2
-	31AUG95	3
REL	1NOV95	-
814229	NOV95	A
914713	OCT97	B
925307	JAN98	C
979716	MAR98	D
1019229	SEP99	E
1058119	JUN00	F



REFERENCE DESIGNATION TABLE			
LAST DESIGNATION USED			
R37	C12	Q4	U2
DESIGNATIONS NOT USED			
	C5		

ITEM	QTY. REQD.	PART NO.	DESCRIPTION	MARK	FIN	MATL
		PARTS LIST				

UNLESS OTHERWISE SPECIFIED
DO NOT SCALE DRAWING
DIMENSIONS ARE IN INCHES AND INCLUDE PLATING THICKNESS
ALL THREADS ARE UNIFIED NATIONAL SERIES, CLASS 2
REMOVE ALL BURRS AND SHARP EDGES

BASIC DIMENSIONS	2 PLACE DECIMALS	3 PLACE DECIMALS
UP TO 6	±.02	±.005
ABOVE 6 TO 24	±.03	±.010
ABOVE 24	±.06	±.015

ANGULAR DIMENSIONS ±2°

1S1G4
USED ON MODEL

DRAWN J.H.REED DATE 30 JUNE,1995
CHKD J.H.REED DATE 5 JULY,1995
MECH J.MAGINN DATE 20 NOV 95
ELEC F.SCHIRR DATE 20 NOV 95

AMPLIFIER RESEARCH

SCHEMATIC
LINEARIZER CONTROL

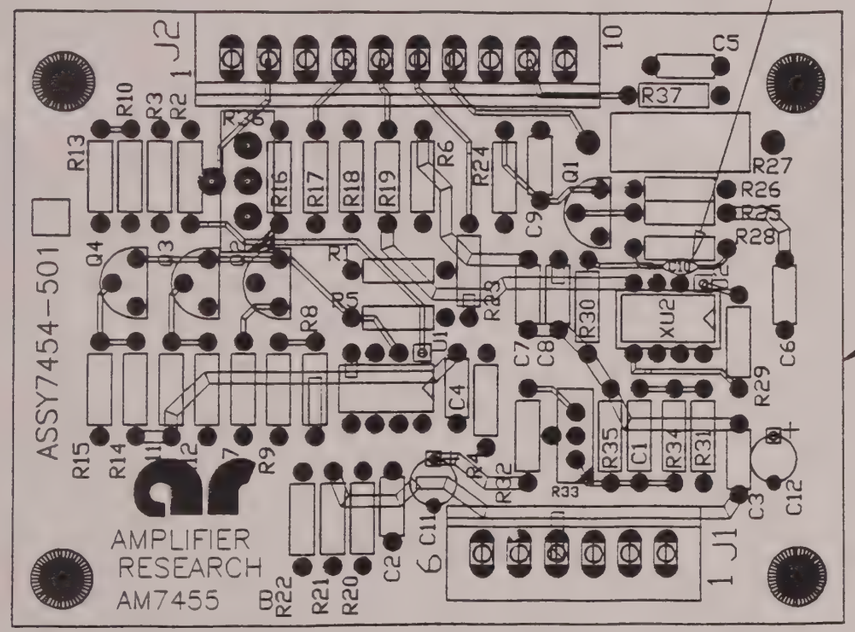
DWG. NO. 1007392

SCALE NONE | SHEET 1 OF 1 | REV. F

TICE TO PERSONS RECEIVING THIS DOCUMENT:
S DOCUMENT IS THE PROPERTY OF AMPLIFIER
EARCH AND THE IDEAS CONTAINED HEREIN, SHALL
NED IN STRICT CONFIDENCE, AND NOT
COPIED OR USED FOR MANUFACTURING
OF ANY PRODUCT WITHOUT PRIOR WRITTEN
SENT OF AMPLIFIER RESEARCH.

ECN	DATE	REV
REL	6OCT95	–
81422	9NOV95	A
87962	5MAR97	B
91471	30CT97	C
97972	6MAR99	D
100792	1JUL99	E

SEE NOTE 1.0



1

NOTES:

1.0 SOLDER C10 ACROSS R28.
2.0 TRIM LEADS ON J1 AND J2.

FOR BOM SEE 1007454-501

ITEM	QTY. REQD.	PART NO.	DESCRIPTION	MARK	FIN	MATL
		PARTS LIST				
	10S1G4					
	5S1G4					
	1S1G4					
	USED ON MODEL					

UNLESS OTHERWISE SPECIFIED
DO NOT SCALE DRAWING
DIMENSIONS ARE IN INCHES AND INCLUDE PLATING THICKNESS
ALL THREADS ARE UNIFIED NATIONAL SERIES, CLASS 2
REMOVE ALL BURRS AND SHARP EDGES

BASIC DIMENSIONS	2 PLACE DECIMALS	3 PLACE DECIMALS
UP TO 6	±.02	±.005
ABOVE 6 TO 24	±.03	±.010
ABOVE 24	±.06	±.015

ANGULAR DIMENSIONS 1/2°

DRAWN J.H.REED DATE 31 MAR 1995
CHKD J.H.REED DATE 1 JUNE,1995
MECH J.MAGINN DATE 9 NOV 95
ELEC F.SCHIRK DATE 9 NOV 95

AMPLIFIER RESEARCH

PWB ASSY
LINEARIZER/CONTROL

DWG. NO. 1007454

SCALE NONE | SHEET 1 OF 1 | REV. E

BILL NO: 1007454-501 REV: H U/M: EA DRAWING NO: ARC-B\1007454
PWB ASSY,LINEARIZER/CTRL BD

SEQ	PART NUMBER	REV	D E S C R I P T I O N	U/M	QUANTITY-PER	DRAWING NUMBER	REF-DSGN
0010	1007392	F	SCHEM DIAG,LINEARIZER CONT.	EA	REF	ARC-C\1007392	
0020	1007454	E	ASSY DWG,PWB ASSY,LINEARIZER/CTRL BD	EA	REF	ARC-B\1007454	
0400	27189		CAPR,CER,0.01uF,20%,500V	EA	1.000	SPR\5GAS-S10	C1
0410	27236		CAPR,FXD,DIP SPACED CER,.1UF,50VDC	EA	6.000	AVX\MD015C104MAA	C2 ,C3 C4 ,C6 C7 ,C8
0420	27210		CAPR,CER,0.22uF,50V	EA	1.000	CRL\CW30C224K	C9
0430	27183		CAPR,CER,220pF,10%,500/1000V	EA	1.000	CRL\DD221	C10
0440	27055		CAPR,TANT,6.8UF,50V	EA	2.000	MAL\TDC685K050NLF	C11 ,C12
1500	41083		CONN,LOCKING HEADER,STR,6 PIN	EA	1.000	PNT\MLSS156-6-C	J1
1510	41084		CONN,LOCKING HEADER,STR,10 PIN,SQR POSTS	EA	1.000	PNT\MLSS156-10-L	J2
2500	2N3906		XSTR,SWNG,PNP,40V,0.2A,1W	EA	1.000	ARE\2N3906	Q1
2510	2N3904		XSTR,SWNG,NPN,40V,0.2A,1W	EA	3.000		Q2 ,Q3 Q4
2700	55612-1002J		RES,FXD,METAL FILM,10K,5%,1/4-1/2W	EA	10.000	TRW\GP55-1002+/-5%	R1 ,R11 R14 ,R18 R19 ,R20 R21 ,R26 R29 ,R35
2705	55612-1001J		RES,FXD,METAL FILM,1K,5%,1/4-1/2W	EA	1.000	TRW\GP55-1001+/-5%	R2
2710	55612-1501J		RES,FXD,METAL FILM,1.5K,5%,1/4-1/2W	EA	2.000	TRW\GP55-1501+/-5%	R3 ,R16
2720	55612-4702J		RES,FXD,METAL FILM,47K,5%,1/4-1/2W	EA	1.000	TRW\GP55-4702+/-5%	R4
2730	55612-1003J		RES,FXD,METAL FILM,100K,5%,1/4-1/2W	EA	2.000	TRW\GP55-1003+/-5%	R5 ,R34
2740	55612-5602J		RES,FXD,METAL FILM,56K,5%,1/4-/12W	EA	1.000	TRW\GP55-5602+/-5%	R6
2750	55612-2702J		RES,FXD,METAL FILM,27K,5%,1/4-1/2W	EA	1.000	TRW\GP55-2702+/-5%	R7
2760	55612-8201J		RES,FXD,METAL FILM,8.2K,5%,1/4-1/2W	EA	2.000	TRW\GP55-8201+/-5%	R8 ,R10
2770	55612-2001J		RES,FXD,METAL FILM,2.0K,5%,1/4-1/2W	EA	1.000	TRW\GP55-2001+/-5%	R9
2780	55612-3301J		RES,FXD,METAL FILM,3.3K,5%,1/4-1/2W	EA	3.000	TRW\GP55-3301+/-5%	R12 ,R17

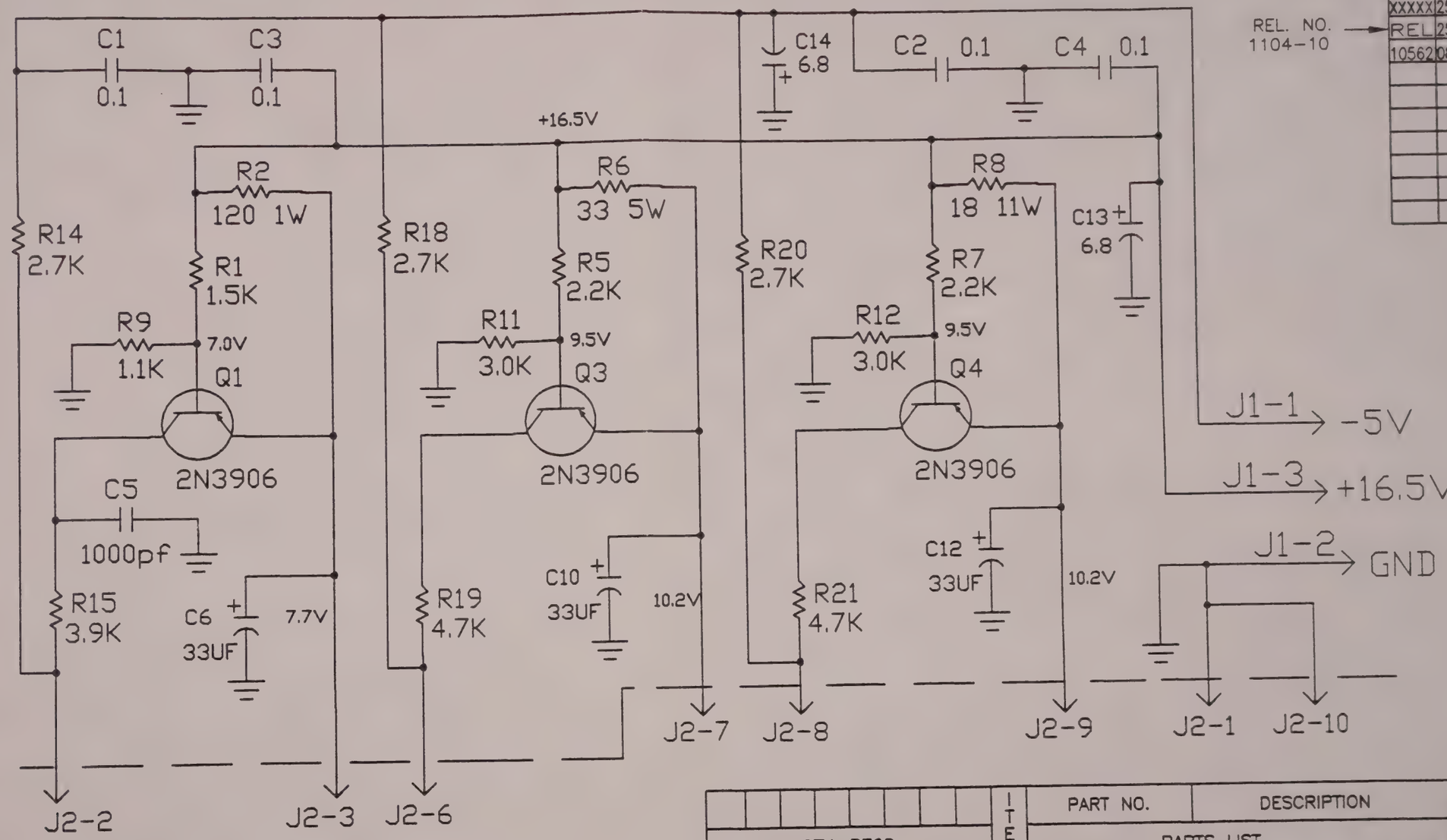
BILL NO: 1007454-501 REV: H U/M: EA DRAWING NO: ARC-B\1007454
PWB ASSY,LINEARIZER/CTRL BD

SEQ	PART NUMBER	REV	D E S C R I P T I O N	U/M	QUANTITY-PER	DRAWING NUMBER	REF-DSGN
							R25
2783	55612-2201J		RES,FXD,METAL FILM,2.2K,5%,1/4-1/2W	EA	1.000	TRW\GP55-2201+/-5%	R13
2787	55612-3601F		RES,FXD,PRECISION,3.6K,1%,1/4-1/2W,CHAR.D	EA	1.000	MEP\RN55D3601F	R15
2790	55612-3901J		RES,FXD,METAL FILM,3.9K,5%,1/4-1/2W	EA	1.000	TRW\GP55-3901+/-5%	R24
2800	55612-56R0J		RES,FXD,METAL FILM,56,5%,1/4-1/2W	EA	1.000	TRW\GP55-56R0+/-5%	R22
2810	55612-1502J		RES,FXD,METAL FILM,15K,5%,1/4-1/2W	EA	1.000	TRW\GP55-1502+/-5%	R23
2820	55514-2200J		RES,FXD,CARBON COMP,220,5%,1W	EA	1.000	A-B\GB2215	R27
2830	55612-3303J		RES,FXD,METAL FILM,330K,5%,1/4-/12W	EA	1.000	TRW\GP55-3303+/-5%	R28
2840	55612-2202J		RES,FXD,METAL FILM,22K,5%,1/4-1/2W	EA	2.000	TRW\GP55-2202+/-5%	R30 ,R37
2850	55612-1212F		RES,FXD,METAL FILM,12.1K,5%,1/4-1/2W	EA	1.000		R32
2860	55919		RES,VAR,CERMET,MULTITURN,TOP ADJ,10K,10%,1/2W	EA	1.000	BOR\3299Y-1-103	R33
2870	55917		RES,VAR,CERMET,MULTITURN,TOP ADJ,1K,10%,1W	EA	1.000	MEP\RJ24FW102	R36
2880	55612-1000J		RES,FXD,METAL FILM,100,5%,1/4-1/2	EA	1.000	TRW\GP55-1000+/-5%	R31
3700	60039		INTEGRATED CKT,DUAL OP AMP	EA	2.000	MOT\MC1558U	U1 ,U2
4500	73010		SOCKET,I.C.,8 PIN,DIP	EA	2.000	TII\C93-08-02	XU1 ,XU2
5000	1007455-101	D	PWB,LINEARIZER/CTRL BD	EA	1.000	ARC-B\1007455	1
5010	66041		WIRE,TFE,26 AWG,STRANDED,TYPE E,WHT	IN	A/R		2

NOTICE TO PERSONS RECEIVING THIS DOCUMENT:
THIS DOCUMENT IS THE PROPERTY OF AMPLIFIER RESEARCH AND THE IDEAS CONTAINED HEREIN, SHALL BE MAINTAINED IN STRICT CONFIDENCE, AND NOT DISCLOSED, COPIED OR USED FOR MANUFACTURING OR SALE OF ANY PRODUCT WITHOUT PRIOR WRITTEN CONSENT OF AMPLIFIER RESEARCH.

ECN	DATE	REV
XXXXX	25OCT99	1
REL	25OCT99	–
10562	08JUN00	A

REL. NO. 1104-10



NOTES:

1.0 UNLESS OTHERWISE INDICATED, ALL RESISTORS ARE IN OHMS, 1/4 WATT, AND 5% TOLERANCE.

2.0 ALL CAPACITORS ARE IN MICROFARADS, AND ARE 50 VOLTS,UNLESS INDICATED.

REFERENCE DESIGNATION TABLE		
LAST DESIGNATION USED		
C14	Q4	R21
DESIGNATIONS NOT USED		
C7,8,9,11	Q2	R3,4,10,13,16,17

ITEM	QTY. REQD.	PART NO.	DESCRIPTION	MARK	FIN	MATL
		PARTS LIST				

UNLESS OTHERWISE SPECIFIED
DO NOT SCALE DRAWING
DIMENSIONS ARE IN INCHES AND INCLUDE PLATING THICKNESS
ALL THREADS ARE UNIFIED NATIONAL SERIES, CLASS 2
REMOVE ALL BURRS AND SHARP EDGES

BASIC DIMENSIONS	2 PLACE DECIMALS	3 PLACE DECIMALS
UP TO 6	±.02	±.005
ABOVE 6 TO 24	±.03	±.010
ABOVE 24	±.06	±.015

ANGULAR DIMENSIONS 1/2°

1S1G4
USED ON MODEL

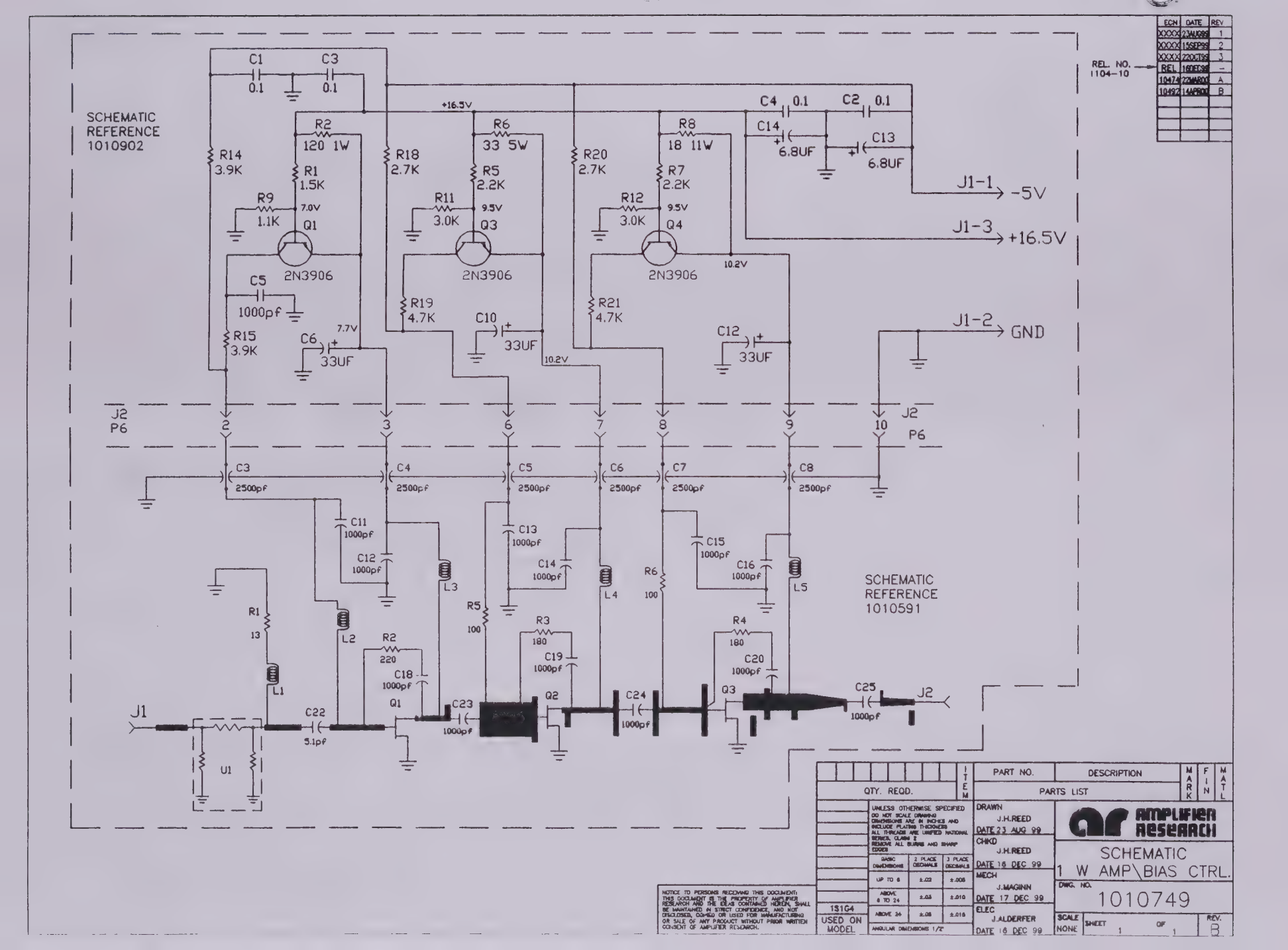
DRAWN J.H.REED DATE 25 OCT 99
CHKD J.H.REED DATE 16 DEC 99
MECH J.MAGINN DATE 17 DEC 99
ELEC J.ALDERFER DATE 16 DEC 99

AMPLIFIER RESEARCH

SCHEMATIC
BIAS CONTROL

DWG. NO. 1010902

SCALE NONE | SHEET 1 OF 1 | REV. A

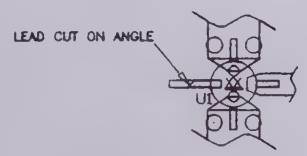

SCHEMATIC REFERENCE 1010902
C1 0.1
C3 0.1
+16.5V
R2 120 1W
R6 33 5W
R8 18 11W
C4 0.1
C2 0.1
C14 6.8UF
C13 6.8UF
R14 3.9K
R1 1.5K
R18 2.7K
R5 2.2K
R20 2.7K
R7 2.2K
J1-1 -5V
R9 1.1K
7.0V
Q1
R11 3.0K
9.5V
Q3
R12 3.0K
9.5V
Q4
J1-3 +16.5V
2N3906
2N3906
2N3906
10.2V
C5 1000pf
R19 4.7K
R21 4.7K
J1-2 GND
R15 3.9K
7.7V
C6 33UF
C10 33UF
10.2V
C12 33UF
J2 P6
2
3
6
7
8
9
10
J2 P6
C3 2500pf
C4 2500pf
C5 2500pf
C6 2500pf
C7 2500pf
C8 2500pf
C11 1000pf
C12 1000pf
C13 1000pf
C14 1000pf
C15 1000pf
C16 1000pf
L3
L4
L5
R6 100
SCHEMATIC REFERENCE 1010591
R1 13
L2
R2 220
R5 100
R3 180
C19 1000pf
R4 180
C20 1000pf
C18 1000pf
L1
Q1
Q2
Q3
C25 1000pf
J2
J1
C22 5.1pf
C23 1000pf
C24 1000pf
U1
REL. NO. 1104-10
ECN DATE REV
XXXX 23AUG99 1
XXXX 15SEP99 2
XXXX 22OCT99 3
REL 16DEC99 –
10474 22MAR00 A
10492 14APR00 B
QTY. REQD.
ITEM
PART NO.
DESCRIPTION
PARTS LIST
MARK
FIN
MATL
UNLESS OTHERWISE SPECIFIED DO NOT SCALE DRAWING DIMENSIONS ARE IN INCHES AND INCLUDE PLATING THICKNESS ALL THREADS ARE UNIFIED NATIONAL SERIES, CLASS 2 REMOVE ALL BURRS AND SHARP EDGES
BASIC DIMENSIONS
2 PLACE DECIMALS
3 PLACE DECIMALS
UP TO 6 ±.03 ±.005
ABOVE 6 TO 24 ±.05 ±.010
ABOVE 24 ±.08 ±.015
ANGULAR DIMENSIONS 1/2°
1S1G4 USED ON MODEL
DRAWN J.H.REED DATE 23 AUG 99
CHKD J.H.REED DATE 16 DEC 99
MECH J.MAGINN DATE 17 DEC 99
ELEC J.ALDERFER DATE 16 DEC 99
AMPLIFIER RESEARCH
SCHEMATIC 1 W AMP\BIAS CTRL.
DWG. NO. 1010749
SCALE NONE
SHEET 1 OF 1
REV. B
NOTICE TO PERSONS RECEIVING THIS DOCUMENT: THIS DOCUMENT IS THE PROPERTY OF AMPLIFIER RESEARCH AND THE IDEAS CONTAINED HEREIN, SHALL BE MAINTAINED IN STRICT CONFIDENCE, AND NOT DISCLOSED, COPIED OR USED FOR MANUFACTURING OR SALE OF ANY PRODUCT WITHOUT PRIOR WRITTEN CONSENT OF AMPLIFIER RESEARCH.

NOTICE TO PERSONS RECEIVING THIS DOCUMENT:
THIS DOCUMENT IS THE PROPERTY OF AMPLIFIER RESEARCH AND THE IDEAS CONTAINED HEREIN SHALL BE MAINTAINED IN STRICT CONFIDENCE, AND NOT DISCLOSED, COPIED OR USED FOR MANUFACTURING OR SALE OF ANY PRODUCT WITHOUT PRIOR WRITTEN CONSENT OF AMPLIFIER RESEARCH.

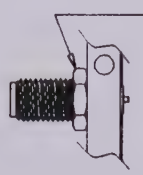
ECN	DATE	REV.
–	15SEP99	–
–	03DEC99	–
REL	19JAN00	–
10492	14APR00	A
10607	12JUL00	B

REL. NO. 1113-09

DETAIL "A"

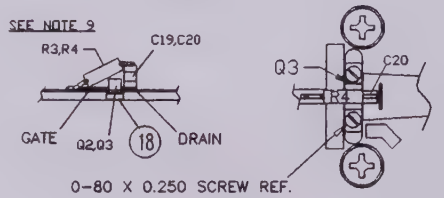


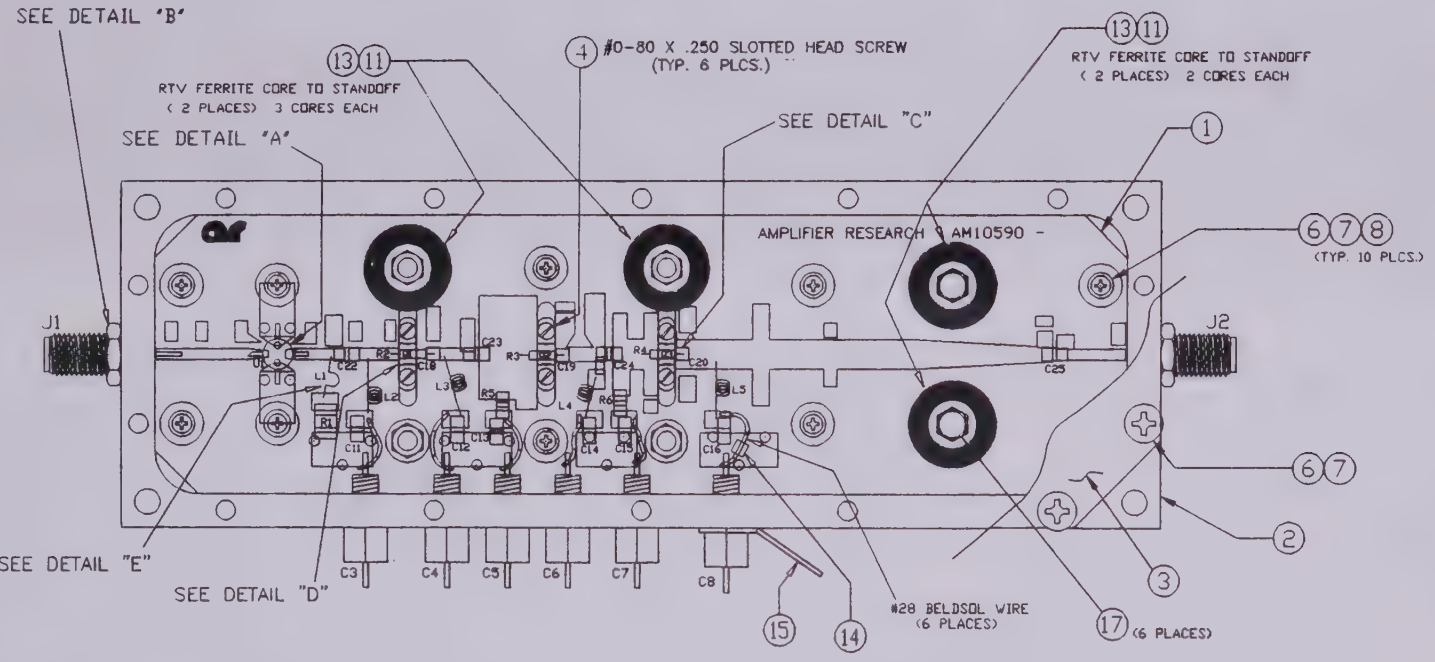
DETAIL "B"



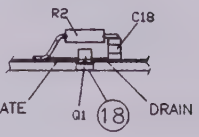
TRIM TEFLON OF PARTS J1 & J2 FLUSH WITH CONNECTOR BODY. CUT CENTER PIN TO 0.075"(IN) INSTALL CONNECTOR FLUSH WITH INNER HOUSING WALL. TIGHTEN LOCKING NUT "A" SECURELY. (DO NOT USE SUPPLIED WASHER)

DETAIL "C"

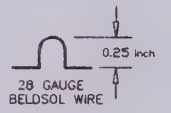




DETAIL "D"



DETAIL "E"



ASSEMBLY PROCEDURE
1 WATT AMP

1) INSTALL P.C. BOARD INTO HOUSING - CENTER MOUNTING SCREW HOLES IN SLOTS FOR Q1, Q2 AND Q3.
2) TEMPORARILY USE MOUNTING HARDWARE TO HOLD BOARD IN PLACE PRIOR TO INSTALLING STANDOFFS, ITEM 17 AT COMPLETION.
3) INSTALL CONNECTOR J1 AND J2 INTO HOUSING.
   NOTE: SEE DETAIL "B".
4) INSTALL FEEDTHRU C3 THRU C8 INTO HOUSING.
5) INSTALL R1, R5, R6 (WITH FACE VALUE DOWN).
6) INSTALL ALL OF THE CERAMIC CHIP CAPS EXCEPT C18, C19, AND C20.
7) INSTALL L1 THRU L5, INSTALL L1 AS SHOWNCLOSE TO C22).
8) INSTALL #28 BELDSOL JUMPER WIRES BETWEEN FEEDTHRU AND P.C. BOARD.

NOTE: THE FOLLOWING FET INSTALLATION MUST BE DONE AT A STATIC APPROVED WORK STATION. PERSONS HANDLING AND INSTALLING THE FET'S MUST BE FAMILIAR WITH THE PROCEDURE THE FET CAN BE DESTROYED BOTH ELECTRICALLY AND MECHANICALLY.

9) FET INSTALLATION,(GATE LEADS OF Q1-Q3 MUST FACE TOWARD J1).
   NOTE: STEPS 1 THRU 6 ABOVE MUST BE COMPLETED BEFORE INSTALLING FETS.
   (a) INSTALL 0-80 SCREWS TO HOLD Q1-Q3, CIRCUIT. TIGHTEN SCREWS, THEN LOOSEN 1/4 TURN BEFORE SOLDERING.
10) INSTALL FEEDBACK CAPACITORS C18, C19, AND C20 .
11) INSTALL FEEDBACK RESISTOR R2 AT Q1 PER DETAIL "D".
12) INSTALL FEEDBACK RESISTORS R3 AND R4 TO Q2 AND Q3 PER DETAIL "C".
13) TIGHTEN SCREWS ON Q1 - Q3.

FOR BOM, SEE 1010589-501

ITEM QTY. REQD.	PART NO.	DESCRIPTION	MARK	FIN	MATL
	PARTS LIST				

UNLESS OTHERWISE SPECIFIED DO NOT SCALE DRAWING. DIMENSIONS ARE IN INCHES AND INCLUDE PLATING THICKNESS. ALL THREADS ARE UNIFIED NATIONAL SERIES, CLASS 2. REMOVE ALL BURRS AND SHARP EDGES.

BASIC DIMENSIONS	2 PLACE DECIMALS	3 PLACE DECIMALS
UP TO 6	±.02	±.005
ABOVE 6 TO 24	±.03	±.010
ABOVE 24	±.08	±.015

ANGULAR DIMENSIONS 1/2°

10S1G4 USED ON MODEL

DRAWN J.H.REED DATE 15 SEPT 99
CHKD J.H.REED DATE 19 JAN 00
MECH J.MAGINN DATE 27 JAN 00
ELEC J.ALDERFER DATE 27 JAN 00

AMPLIFIER RESEARCH

ASSEMBLY
PWB, 1 WATT AMP

DWG. NO. 1010589

SCALE 2/1 | SHEET 1 OF 1 | REV. B

BILL NO: 1010589-501 REV: A U/M: EA DRAWING NO: ARC-A\1010589
PWB ASSY,LOW LEVEL "S" MODULE

SEQ	PART NUMBER	REV	D E S C R I P T I O N	U/M	QUANTITY-PER	DRAWING NUMBER	REF-DSGN
0010	1010591	-	SCHEM DIAG,LOW LEVEL "S" MODULE	EA	REF	ARC-B\1010591	
0020	1010589	B	ASSY DWG,LOW LEVEL "S" MODULE	EA	REF	ARC-C\1010589	
0400	27099		CAPR,FEED-THRU,FILT,2500PF,500V	EA	6.000	MET\51-719-011	C3 ,C4 C5 ,C6 C7 ,C8
0410	27039		CAPR,CHIP,CER,1000pF,10%,50V	EA	12.000	ATC\700B102MCA50X	C11 ,C12 C13 ,C14 C15 ,C16 C18 ,C19 C20 ,C23 C24 ,C25
0420	27024		CAPR,CHIP,5.1pF,0.5%,500V	EA	1.000	DIL\C17AH5R1D500NT	C22
1500	41243		CONN,COAX,BULKHD JACK,SMA,(F)	EA	2.000	DTA\1321000K82165	J1 ,J2
1800	66052		WIRE,MAGNET,SOLDERABLE,28 AWG,GRN	EA	1.000		L1
1810	1007507-102	-	INDUCTOR,AIR WOUND,.050ID,34GA,5T	EA	4.000	ARC-A\1007507	L2 ,L3 L4 ,L5
2500	1000034-183	BJ	XSTR,RF,LOW NOISE,GaAsFET	EA	1.000	ARC-A\1000034	Q1
2510	1000034-184	BJ	XSTR,RF,MED PWR,GaAsFET	EA	1.000	ARC-A\1000034	Q2
2520	1000034-185	BJ	XSTR,RF,MED PWR,GaAsFET	EA	1.000	ARC-A\1000034	Q3
2700	55649-13R0J		RES,FXD,CHIP,13,5%,1W	EA	1.000	D-K\P13XCT-ND	R1
2710	55511-2200J		RES,FXD,CARBON COMP,220,5%,1/8W	EA	1.000	A-B\BB2215	R2
2720	55511-1800J		RES,FXD,CARBON COMP,180,5%,1/8W	EA	2.000	A-B\BB1815	R3 ,R4
2730	55647-1000J		RES,FXD CHIP,100 OHM,1/8W,5%	EA	2.000	D-K\P100-ECT-ND	R5 ,R6
3700	25069		ATTEN,FXD,2dB,1W,70 MIL PKG	EA	1.000	MIN\PAT-2	U1
5000	1010590-101	-	PWB,LOW LEVEL "S" MODULE	EA	1.000	ARC-B\1010590	1
5010	1010548-101	-	HSG,LOW LEVEL "S" MODULE	EA	1.000	ARC-D\1010548	2
5020	1010757-101	-	COVER,LOW LEVEL 1W AMP,S MODULE	EA	1.000	ARC-B\1010757	3
5030	11145		SCREW,MACH,FIL HD,SLOTTED,0-80 X .25	EA	6.000		4

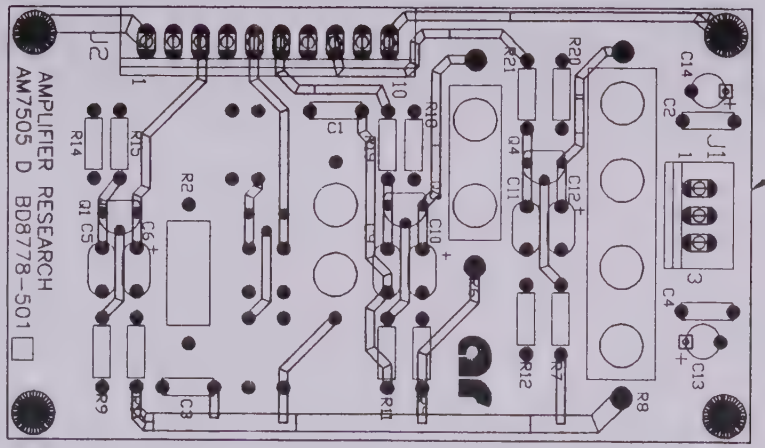
BILL NO: 1010589-501 REV: A U/M: EA DRAWING NO: ARC-A\1010589
PWB ASSY,LOW LEVEL "S" MODULE

SEQ	PART NUMBER	REV	D E S C R I P T I O N	U/M	QUANTITY-PER	DRAWING NUMBER	REF-DSGN
5050	11010		SCREW,MACH,PAN HD,CROSS-REC,S/S,4-40 X .25	EA	24.000	\MS51957-13	6
5060	12047		WASH,LOCK,SPLIT,S/S,#4	EA	24.000	\MS35338-135	7
5070	12010		WASH,FLAT,S/S,#4,.250 OD X .125 ID X .022 THK	EA	10.000	\MS15795-803	8
5090	66054		WIRE,MAGNET,SOLDERABLE,28 AWG,RED	IN	A/R		10
5100	1000643-612	C	CORE,FERRITE,TOROID,3E2A	EA	10.000	ARC\1000643	11
5120	77066		ADH,RTV,SELF-LVL,CLEAR	EA	A/R	G-E\GE118	13
5130	1000643-401	C	CORE,FERRITE,BEAD	EA	1.000	ARC\1000643	14
5140	69101		LUG,SOLDER,BENT TONGUE,3/4 L,3/8 OD,1/4 STUD	EA	1.000	HHS\1496	15
5160	14049	-	SPACER,HEX,THD,M-F,A,1/4 HEX,X.625 LG X 4-40	EA	6.000	KEY\8402	17
5170	1011381-101	-	SPACER,PWB	EA	3.000	ARC-B\1011381	18

NOTICE TO PERSONS RECEIVING THIS DOCUMENT:
THIS DOCUMENT IS THE PROPERTY OF AMPLIFIER RESEARCH AND SHALL CONTINUOUSLY REMAIN SHALL BE MAINTAINED IN STRICT CONFIDENCE, AND NOT DISCLOSED, COPIED OR USED FOR MANUFACTURING OR SALE OF ANY P. DUCT WITHOUT PRIOR WRITTEN CONSENT OF AMPLIFIER RESEARCH.

ECN	DATE	REV.
XXXXX	21OCT99	-
REL	16DEC99	-
105388	2MAY00	A

REL. NO. 1104-10



1

FOR BOM, SEE 1010748-501

QTY. REQD.	ITEM	PART NO.	DESCRIPTION	MARK	FIN	MATL
		PARTS LIST				

UNLESS OTHERWISE SPECIFIED
DO NOT SCALE DRAWING
DIMENSIONS ARE IN INCHES AND INCLUDE PLATING THICKNESS
ALL THREADS ARE UNIFIED NATIONAL SERIES, CLASS 2
REMOVE ALL BURRS AND SHARP EDGES

BASIC DIMENSIONS	2 PLACE DECIMALS	3 PLACE DECIMALS
UP TO 6	±.02	±.005
ABOVE 6 TO 24	±.05	±.010
ABOVE 24	±.05	±.015
ANGULAR DIMENSIONS 1/2°		

DRAWN J.H.REED DATE 21 OCT 99
CHKD J.H.REED DATE 16 DEC 99
MECH J.MAGINN DATE 02 DEC 99
ELEC J.ALDERFER DATE 16 DEC 99

1S1G4
USED ON MODEL

AMPLIFIER RESEARCH

PWB,ASSY
BIAS CONTROL BD.

DWG. NO. 1010748

SCALE NONE | SHEET 1 OF 1 | REV. A

BILL NO: 1010748-501 REV: B U/M: EA DRAWING NO: ARC-C\1010748
PWB ASSY,BIAS CTRL,1W S MODULE

SEQ	PART NUMBER	REV	D E S C R I P T I O N	U/M	QUANTITY-PER	DRAWING NUMBER	REF-DSGN
0010	1010748	A	ASSY DWG,BIAS CTRL,1W S MODULE	EA	REF	ARC-C\1010748	
0020	1010749	B	SCHEM DIAG,BIAS CTRL	EA	REF	ARC-B\1010749	
0400	27236		CAPR,FXD,DIP SPACED CER,.1UF,50VDC	EA	4.000	AVX\MD015C104MAA	C1 ,C2 C3 ,C4
0410	27179		CAPR,CER,1000pF,1000V,10%,CHAR Z5F	EA	3.000	NIC\NCD102K1KVY5F	C5 ,C9 C11
0420	27051		CAPR,TANT,33UF,35VDC,EPOXY	EA	3.000	AVX\TAP336K035HSB	C6 ,C10 C12
0430	27055		CAPR,TANT,6.8UF,50V	EA	2.000	MAL\TDC685K050NLF	C13 ,C14
1500	41082		CONN,STR,3 PIN	EA	1.000	PNT\MLSS156-3	J1
1510	41084		CONN,LOCKING HEADER,STR,10 PIN,SQR POSTS	EA	1.000	PNT\MLSS156-10-L	J2
2500	2N3906		XSTR,SWNG,PNP,40V,0.2A,1W	EA	3.000	ARE\2N3906	Q1 ,Q3 Q4
2700	55612-1501J		RES,FXD,METAL FILM,1.5K,5%,1/4-1/2W	EA	1.000	TRW\GP55-1501+/-5%	R1
2730	55514-1200J		RES,FXD,CARBON COMP,120,5%,1W	EA	1.000	A-B\GB1215	R2
2740	55612-2201J		RES,FXD,METAL FILM,2.2K,5%,1/4-1/2W	EA	2.000	TRW\GP55-2201+/-5%	R5 ,R7
2750	55515-33R0J		RES,FXD,CARBON COMP,33,5%,2W	EA	1.000	A-B\HB3305	R6
2760	55724-18R0J		RES,FXD,WW,18,5%,11W	EA	1.000	OHM\90J18R	R8
2770	55612-1101J		RES,FXD,METAL FILM,1.1K,5%,1/4-1/2W	EA	1.000	TRW\GP55-1101+/-5%	R9
2780	55612-3001F		RES,FXD,PRECISION,3K,1%,1/4W,CHAR.D	EA	2.000	IRC\RN55D3001F	R11 ,R12
2800	55612-3901J		RES,FXD,METAL FILM,3.9K,5%,1/4-1/2W	EA	2.000	TRW\GP55-3901+/-5%	R14 ,R15
2810	55612-2701J		RES,FXD,METAL FILM,2.7K,5%,1/4-1/2W	EA	2.000	TRW\GP55-2701+/-5%	R18 ,R20
2820	55612-4701J		RES,FXD,METAL FILM,4.7K,5%,1/4-1/2W	EA	2.000	TRW\GP55-4701+/-5%	R19 ,R21
5000	1007505-101	D	PWB,BIAS CTRL,1 WATT AMP	EA	1.000	ARC-B\1007505	1

NOTICE TO PERSONS RECEIVING THIS DOCUMENT:
THIS DOCUMENT IS THE PROPERTY OF AMPLIFIER RESEARCH AND THE IDEAS CONTAINED HEREIN, SHALL BE MAINTAINED IN STRICT CONFIDENCE, AND NOT DISCLOSED, COPIED OR USED FOR MANUFACTURING OR SALE OF ANY PRODUCT WITHOUT PRIOR WRITTEN CONSENT OF AMPLIFIER RESEARCH.

ECN	DATE	REV
–	04JUN98	1
REL	28JUL98	–
9798	25MAR99	A
10163	13SEP99	B

RELEASE NO. 1176-01

+16.5V
C1
C13 0.039
C2 100UF
R2 3.3K
U1
C14 0.039
R1 0.18
R3 120
R4 3.3K
R5 680
R6 500,1W CW
+13.5V
C16 100
C3 1000pf
R7 560
R8 2.7,11W
11.0V
R14
C11
TP1 11.0V
C6 1K
1000pf
R10 1.8K
10.3V
Q2 2N3906
2N3904
Q1
C15 0.039
VR1 1N5230A
R11 1.8K
C7 200pf
C18 33
L2
-5V
C4
C17 6.8
C5 1000pf
R9 1.1K
C8 0.039
R12 51
L1
Q3
C10 1000pf
J2 RFOUT
RFIN J1
L4
U2
C12 5.1pf
C9 1000pf
L3
R13 13

ITEM	QTY. REQD.	PART NO.	DESCRIPTION	MARK	FIN	MATL
		PARTS LIST				

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES AND INCLUDE PLATING THICKNESS
ALL THREADS ARE UNIFIED NATIONAL SERIES, CLASS 2
REMOVE ALL BURRS AND SHARP EDGES

BASIC DIMENSIONS	2 PLACE DECIMALS	3 PLACE DECIMALS
UP TO 6	± .02	± .005
ABOVE 6 TO 24	± .03	± .010
ABOVE 24	± .06	± .015

ANGULAR DIMENSIONS ± 2°

25S1G4A
USED ON MODEL

DRAWN
DATE 27 JUNE 96
CHKD J.H.REED
DATE 28 JULY 98
MECH J.MAGINN
DATE 30 JULY 98
ELEC F.SCHIRK
DATE 28 JULY 98

AMPLIFIER RESEARCH

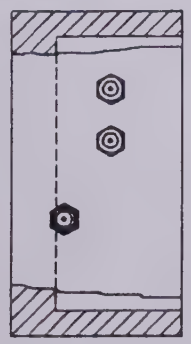
SCHEMATIC
4 WATT AMP

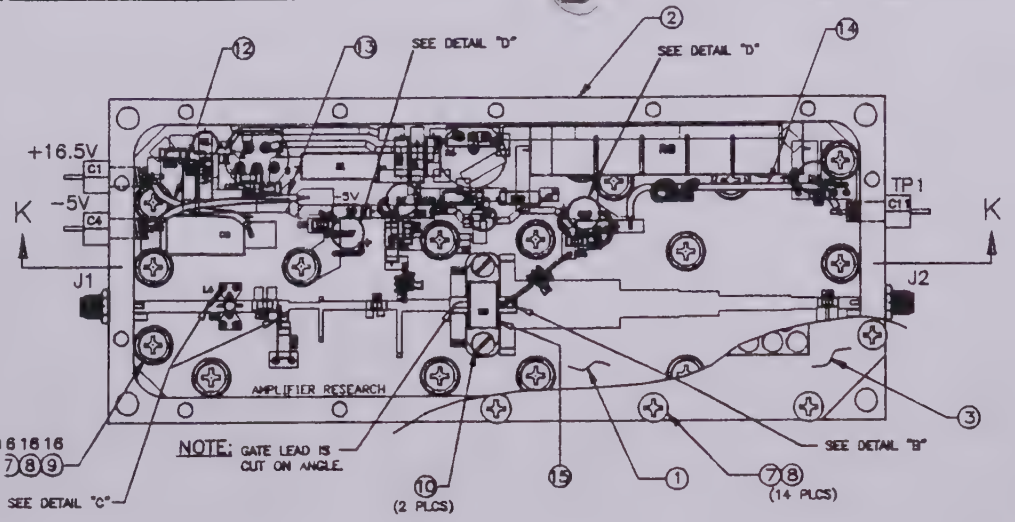
DWG. NO. 1009543

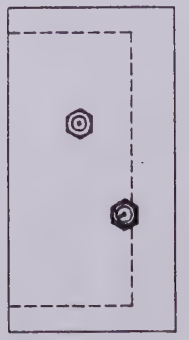
SCALE NONE | SHEET 1 OF 1 | REV. B

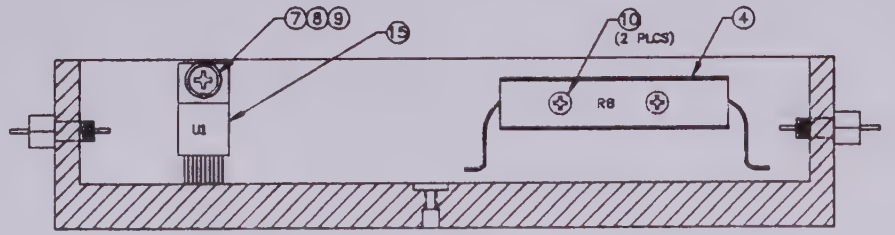
RELEASE NO. 1178-01

REV	DATE
–	2000
A	27MAY99
B	13SEP99
C	30NOV99
D	10JAN00









SECTION K-K

NOTES:

1.0 INSTALL PWB INTO HOUSING. CENTER THE CUTOUT FOR THE FET'S OVER THE 2-56 FET MOUNTING SCREW HOLES.

2.0 TIGHTEN ALL MOUNTING SCREWS FOR PWB BEFORE BEFORE BEGINNING INSTALLATION OF COMPONENTS.

3.0 INSTALL ALL COMPONENTS INTO HOUSING BEFORE FET INSTALLATION. THIS MUST BE DONE LAST.

CAUTION

4.0 THE FET INSTALLATION MUST BE DONE AT A STATIC APPROVED WORK STATION. PERSONS HANDLING AND INSTALLING THE FET'S, MUST BE FAMILAR WITH GaAs FET HANDLING PROCEDURES. THE GaAs FET CAN BE DESTROYED BOTH ELECTRICALLY AND MECHANICALLY.

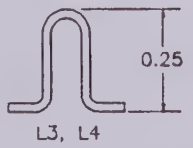
5.0 DO NOT PUSH THE GATE OR DRAIN LEADS DOWN TO THE PC BOARD WHEN INSTALLING THE FET. USE SOLDER TO FILL THE AREA BETWEEN THE LEAD AND THE PC BOARD.

DETAIL "A"

TRIM TEFLON OF PARTS J1 & J2 FLUSH WITH CONNECTOR BODY. CUT CENTER PIN TO 0.075"(IN). INSTALL CONNECTOR FLUSH WITH INNER HOUSING WALL. TIGHTEN LOCKING NUT "A" SECURELY. (DO NOT USE SUPPLIED WASHER)

DETAIL "C"

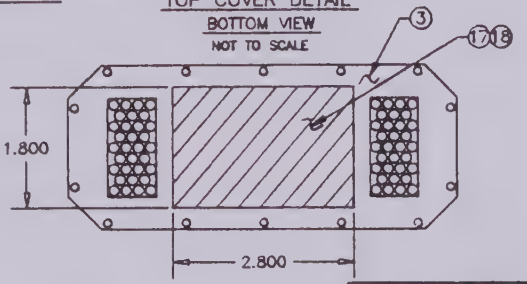
NOT TO SCALE



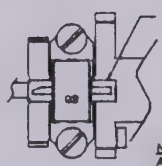
TOP COVER DETAIL

BOTTOM VIEW

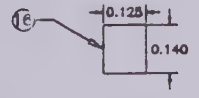
NOT TO SCALE



FOR BOM SEE: 1009542-501

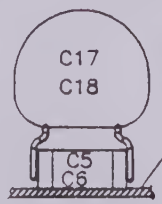


DETAIL "B"



NOTE:
ADD PIECE OF ITEM 16 (0.003 THK BRASS SHIM STOCK) TINNED TO TOP SIDE OF BOTH THE GATE AND DRAIN LEADS OF Q3.

DETAIL "D"



NOTES:

INSTALL TANT. CAP ON TOP OF CHIP CAPS AS SHOWN. KEEPING LEADS AS SHORT AS POSSIBLE. (SIDE VIEW)

ITEM	QTY. REQD.	PART NO.	DESCRIPTION	MARK	FIN	MATL
		PARTS LIST				

UNLESS OTHERWISE SPECIFIED DO NOT SCALE DRAWING. DIMENSIONS ARE IN INCHES AND DECIMAL FLUSH TOLERANCES ALL SURFACES ARE UNDER MATERIAL COVER, CLEAN & REMOVE ALL BURRS AND SHARP EDGES

DECIMAL DIMENSIONS	2 PLACE DECIMALS	3 PLACE DECIMALS
UP TO 6	±.03	±.005
ABOVE 6 TO 24	±.05	±.010
ABOVE 24	±.10	±.015

ANGULAR DIMENSIONS ±1/2°

DRAWN C.GWYNN DATE 11 MAY 98
CHKD M. BICKELMAN DATE 27 JUL 98
MECH J.MAGINN DATE 30 JULY 98
ELEC F.SCHIRK DATE 29 JULY 98

AMPLIFIER RESEARCH

ASSEMBLY 4 WATT AMP

DWG. NO. 1009542

SCALE 2/1 SHEET 1 OF 1 REV. D

2SS1G4A USED ON MODEL

BILL NO: 1009542-501 REV: B U/M: EA DRAWING NO: ARC-C\1009542
4 WATT AMP ASSY

SEQ	PART NUMBER	REV	D E S C R I P T I O N	U/M	QUANTITY-PER	DRAWING NUMBER	REF-DSGN
0010	1009542	D	ASSY DWG,4 WATT AMP ASSY	EA	REF	ARC-C\1009542	
0010	1009543	B	SCHEM,4 WATT AMP	EA	REF	ARC-C\1009543	
0400	27099		CAPR,FEED-THRU,FILT,2500PF,500V	EA	3.000	MET\51-719-011	C1 ,C4 C11
0410	27068		CAPR,ELECT,100uF,50VDC,AXIAL	EA	1.000	ICI\107TTA050M	C2
0420	27039		CAPR,CHIP,CER,1000pF,10%,50V	EA	5.000	ATC\700B102MCA50X	C3 ,C5 C6 ,C9 C10
0423	27182		CAPR,CER,200pF,10%,600/1000V,CHAR S3N	EA	1.000	MUE\GH-201K	C7
0425	27251		CAPR,CHIP,0.039uF,20%,50V	EA	4.000	ATC\200B393MP50	C8 ,C13 C14 ,C15
0430	27024		CAPR,CHIP,5.1pF,0.5%,500V	EA	1.000	DIL\C17AH5R1D500NT	C12
0440	27060		CAPR,ELECT,100uF,50V,RADIAL	EA	1.000	ICI\107RMR050M	C16
0450	27055		CAPR,TANT,6.8UF,50V	EA	1.000	MAL\TDC685K050NLF	C17
0460	27051		CAPR,TANT,33UF,35VDC,EPOXY	EA	1.000	AVX\TAP336K035HSB	C18
1500	41243		CONN,COAX,BULKHD JACK,SMA,(F)	EA	2.000	DTA\1321000K82165	J1 ,J2
1800	1007507-102	-	INDUCTOR,AIR WOUND,.050ID,34GA,5T	EA	1.000	ARC-A\1007507	L1
1805	1007507-105	-	INDUCTOR,AIR WOUND,.125ID,28GA,2T	EA	1.000	ARC-A\1007507	L2
1810	66052		WIRE,MAGNET,SOLDERABLE,28 AWG,GRN	EA	2.000		L3 ,L4
2500	2N3904		XSTR,SWNG,NPN,40V,0.2A,1W	EA	1.000		Q1
2510	2N3906		XSTR,SWNG,PNP,40V,0.2A,1W	EA	1.000	ARE\2N3906	Q2
2520	1000034-182	BH	XSTR,RF,PWR,GaAsFET	EA	1.000	ARC-A\1000034	Q3
2530	55715-R180J		RES,FXD,WW,0.18,5%,2W,TYPE SPH	EA	1.000		R1
2710	55612-3301J		RES,FXD,METAL FILM,3.3K,5%,1/4-1/2W	EA	2.000	TRW\GP55-3301+/-5%	R2 ,R4
2720	55612-1001J		RES,FXD,METAL FILM,1K,5%,1/4-1/2W	EA	2.000	TRW\GP55-1001+/-5%	R3 R14
2740	55612-6800J		RES,FXD,METAL FILM,680,5%,1/4-1/2W	EA	1.000	TRW\680 OHM 1/2W5%	R5

BILL NO: 1009542-501 REV: B U/M: EA DRAWING NO: ARC-C\1009542
4 WATT AMP ASSY

SEQ	PART NUMBER	REV	D E S C R I P T I O N	U/M	QUANTITY-PER	DRAWING NUMBER	REF-DSGN
2750	55916		RES,VAR,CERMET,MULTITURN,TOP ADJ,500,10%,1W	EA	1.000	MEP\8024EKW-501	R6
2760	55612-5600J		RES,FXD,METAL FILM,560,5%,1/4-1/2W	EA	1.000	TRW\GP55-5600+/-5%	R7
2770	55724-2R70J		RES,FXD,WW,2.7,5%,11W	EA	1.000	OHM\90J2R7	R8
2780	55612-1101J		RES,FXD,METAL FILM,1.1K,5%,1/4-1/2W	EA	1.000	TRW\GP55-1101+/-5%	R9
2790	55612-1801J		RES,FXD,METAL FILM,1.8K,5%,1/4-1/2W	EA	2.000	TRW\GP55-1801+/-5%	R10 ,R11
2800	55612-51R0J		RES,FXD,METAL FILM,51,5%,1/4-1/2W	EA	1.000	TRW\GP55-51R0+/-5%	R12
2810	55649-13R0J		RES,FXD,CHIP,13,5%,1W	EA	1.000	D-K\P13XCT-ND	R13
3700	60033		INTEGRATED CKT,LINEAR,POS.,ADJ.V,2A	EA	1.000	SGS\L200CV	U1
3710	25055	-	ATTEN,FXD,4dB,1W,70 MIL PKG	EA	1.000	MIN\PAT-4	U2
4000	1N5230A		DIODE,ZENER,4.7V,10%,500MW	EA	1.000	MOT\1N5230A	VR1
5000	1008132-101	A	PWB,4 WATT AMP	EA	1.000	ARC-B\1008132	1
5010	1009544-101	-	HSG,4 WATT AMP	EA	1.000	ARC-C\1009544	2
5020	1008121-101	-	COVER,4 WATT AMP	EA	1.000	ARC-B\1008121	3
5030	69358		CLIP,COMPNT,1.75"L,.333"W,.377"HT	EA	1.000	OHM\5908	4
5060	11010		SCREW,MACH,PAN HD,CROSS-REC,S/S,4-40 X .25	EA	31.000	\MS51957-13	7
5070	12047		WASH,LOCK,SPLIT,S/S,#4	EA	31.000	\MS35338-135	8
5080	12010		WASH,FLAT,S/S,#4,.250 OD X .125 ID X .022 THK	EA	17.000	\MS15795-803	9
5090	11084		SCREW,MACH,PAN HD,CROSS-REC,S/S,2-56 X .18	EA	4.000	\MS51957-2	10
5110	66027		WIRE,TFE,22 AWG,STRANDED,TYPE E,RED	EA	A/R		12
5120	66032		WIRE,TFE,22 AWG,STRANDED,TYPE E,VIO	EA	A/R		13
5130	66031		WIRE,TFE,22 AWG,STRANDED,TYPE E,BLU	EA	A/R		14
5140	77064		COMPOUND,THERMAL JOINT,TYPE 120	OZ	A/R	WAK\120-S	15
5150	77144	-	SHIM,BRASS,6.00X.003 THK (ROLL 100")	IN	A/R	MSS\00051037	16
5160	69332		FOAM,CONDUCTIVE	IN	A/R	MMM\2802	17

BILL NO: 1009542-501 REV: B U/M: EA DRAWING NO: ARC-C\1009542
4 WATT AMP ASSY

SEQ	PART NUMBER	REV	D E S C R I P T I O N	U/M	QUANTITY-PER	DRAWING NUMBER	REF-DSGN
5170	77066		ADH,RTV,SELF-LVL,CLEAR	OZ	A/R	G-E\GE118	18

NOTICE TO PERSONS RECEIVING THIS DOCUMENT:
THIS DOCUMENT IS THE PROPERTY OF AMPLIFIER RESEARCH AND THE IDEAS CONTAINED HEREIN SHALL BE MAINTAINED IN STRICT CONFIDENCE, AND NOT DISCLOSED, COPIED OR USED FOR MANUFACTURING OR SALE OF ANY PRODUCT WITHOUT PRIOR WRITTEN CONSENT OF AMPLIFIER RESEARCH.

ECN	DATE	REV
XXXX	09DEC97	-
REL	28JUL98	-
9561	02SEP98	-
9788	28APR99	B
10117	19AUG99	C
10328	09DEC99	D
10480	14APR00	E

RELEASE NO. 1176-01

U1 L200CV 60033
R1 0.2,5W
R2 120
R3 1.5K
R4 3.3K
R5 2.7,11W
R6 680
R7 500,1W CW
R8 3.3K
R9 4.53K
R10 1.1K
R11 1.8K
R12 1.1K
R13 1.8K
R14 4.53K
R15 1.5K
R16 2.7,11W
R17 50
R18 50
R19 51
R20 51
R21 1K
R22 1K
R23 13
R24 13
R25 1K
R26 1K
R27 1.8K
R28 3.9K
R29 5.6K
R30 1K
R31 680
C1 100UF
C2 100UF
C3 1000pf
C4 1000pf
C5 1000pf
C6 1000pf
C7 0.039
C8 0.039
C9 1000pf
C10 1000pf
C11 1000pf
C12 1000pf
C13 0.039
C14 0.039
C15 1000pf
C16 1000pf
C17 5.1
C18 5.1
C20 1000pf
C21
C22
C23 0.039
C24 0.039
C25 0.039
C26 100
C27 0.039
C28
C29 200pf
C30 200pf
C31 1.0
C32 33
C33 33
L1
L2
L5
L6
VR1 1N5230A 4.7V
Q1 2N3904
Q2 2N3906
Q3
Q4
Q5 2N3906
U2 907 QUAD
U3 907 QUAD
U4/A
U4/B
U4/C
U4/D
CR1
DS1
J1
J2
TP1
TP2
+16.5V
+13.5V
+10.8V
-5V
10.5V
10.1V
13.4V
8.0V
FAULT OUT (FAULT=0)

QTY. REQD.	ITEM	PART NO.	DESCRIPTION	MARK	FIN	MATL
		PARTS LIST				

UNLESS OTHERWISE SPECIFIED
DO NOT SCALE DRAWING
DIMENSIONS ARE IN INCHES AND INCLUDE PLATING THICKNESS
ALL THREADS ARE UNIFIED NATIONAL SERIES, CLASS 2
REMOVE ALL BURRS AND SHARP EDGES

BASIC DIMENSIONS	2 PLACE DECIMALS	3 PLACE DECIMALS
UP TO 6	±.03	±.005
ABOVE 6 TO 24	±.03	±.010
ABOVE 24	±.06	±.015

ANGULAR DIMENSIONS 1/2°

100S1G4
USED ON MODEL

DRAWN J.H.REED DATE 09 DEC 97
CHKD J.H.REED DATE 28 JULY 98
MECH J.MAGINN DATE 30 JULY 98
ELEC F.SCHIRK DATE 30 JULY 98

AMPLIFIER RESEARCH

SCHEMATIC
QUAD AMP

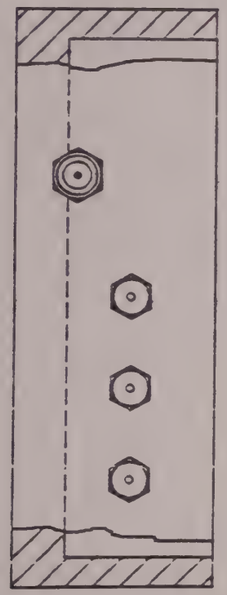
DWG. NO. 1009163

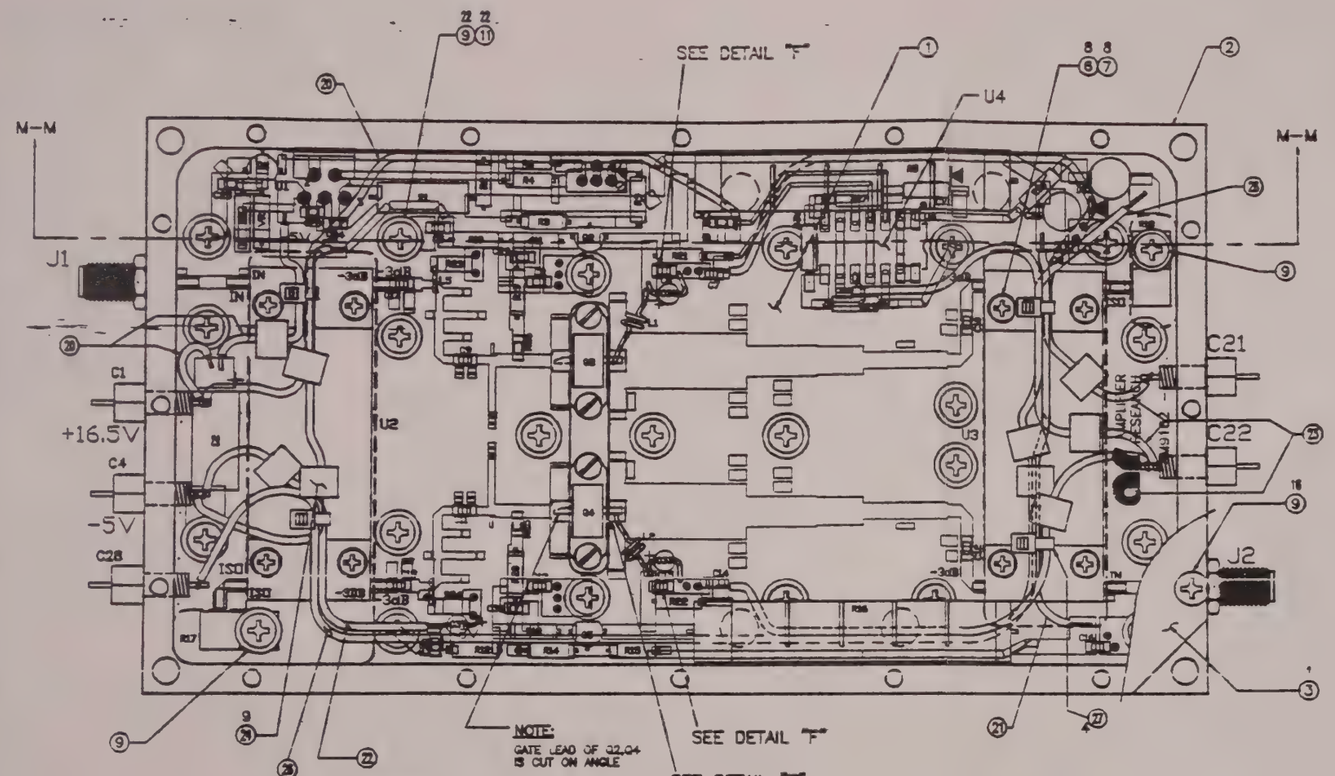
SCALE NONE | SHEET 1 OF 1 | REV. E

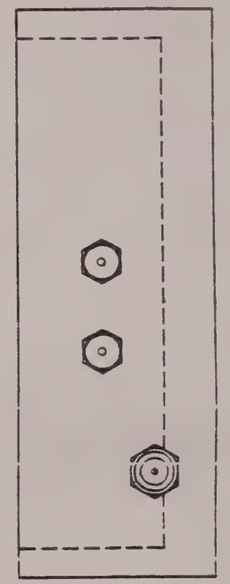
NOTICE TO PERSONS RECEIVING THIS DRAWING
THIS DRAWING IS THE PROPERTY OF [illegible]
IT IS LOANED SUBJECT TO THE AGREEMENT THAT IT WILL NOT BE COPIED OR REPRODUCED IN WHOLE OR IN PART, AND THAT NO RIGHT TO THE INFORMATION CONTAINED HEREIN SHALL BE GRANTED BY THE LOAN OR SALE OF ANY PRODUCT WITHOUT PRIOR WRITTEN CONSENT OF AMPLIFIER RESEARCH.

SYM	DATE	REV
0000	00SEP97	1
0000	14MAR98	2
RS	29JUL98	—
014	30JUL98	4
47	04AUG98	3
001	13AUG98	2
001	26AUG98	2
0042	08SEP98	5

RELEASE NO. 1175-01







NOTES:

1.0 INSTALL PWB INTO HOUSING. CENTER THE CUTOUT FOR THE FET'S OVER THE 2-56 FET MOUNTING SCREW HOLES.

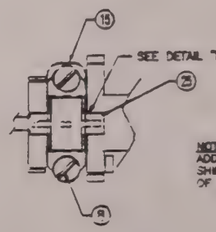
2.0 TIGHTEN ALL MOUNTING SCREWS FOR PWB BEFORE BEGINNING INSTALLATION OF COMPONENTS.

3.0 INSTALL ALL COMPONENTS INTO HOUSING BEFORE FET INSTALLATION. THIS MUST BE DONE LAST.

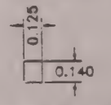
CAUTION

4.0 THE FET INSTALLATION MUST BE DONE AT A STATIC APPROVED WORK STATION. PERSONS HANDLING AND INSTALLING THE FET'S MUST BE FAMILIAR WITH GaAs FET HANDLING PROCEDURES. THE GaAs FET CAN BE DESTROYED, ELECTRICALLY AND MECHANICALLY.

5.0 DO NOT PUSH THE GATE OR DRAIN LEADS DOWN TO THE P.C. BOARD WHEN INSTALLING THE FET. USE SOLDER TO FILL THE AREA BETWEEN THE LEAD AND THE P.C.BOARD.

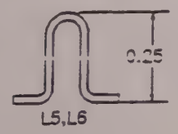


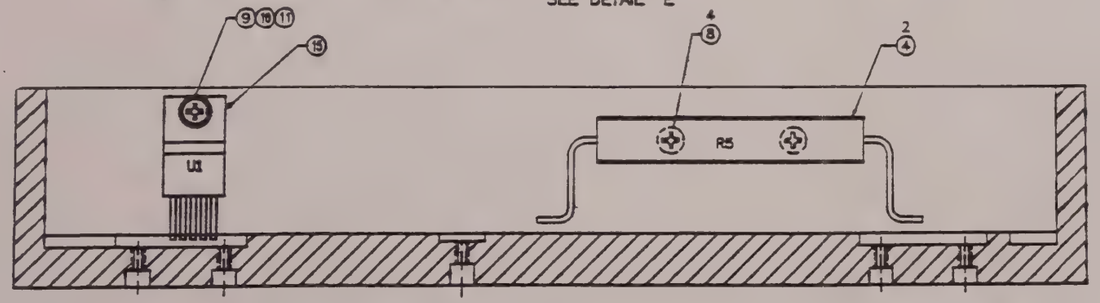
DETAIL "E"



NOTE:
ADD PIECE OF ITEM 25 (0.003 THK BRASS SHIM STOCK) TINNED ON BOTH SIDES TO TOP OF THE GATE AND DRAIN LEADS OF Q3,Q4.

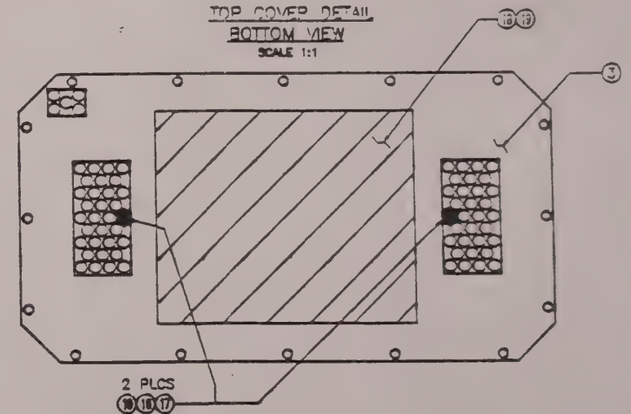
DETAIL "C"
NOT TO SCALE

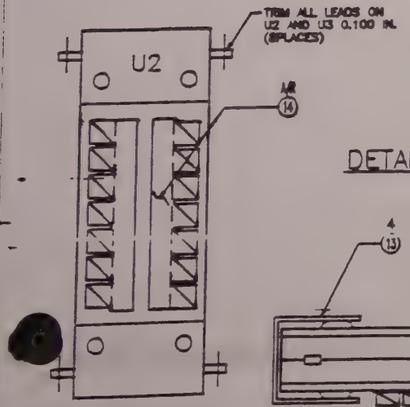




SECTION M - M

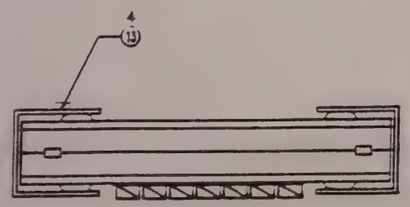
TOP COVER DETAIL
BOTTOM VIEW
SCALE 1:1





BOTTOM VIEW
OF U2 & U3

DETAIL "A"

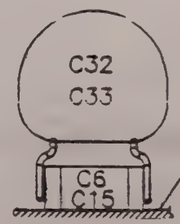


SIDE VIEW
OF U2 & U3

DETAIL "B"

TRIM TEFLON OF PARTS J1, AND J2 FLUSH WITH CONNECTOR BODY. CUT CENTER PIN TO 0.075"(IN) INSTALL CONNECTOR FLUSH WITH INNER HOUSING WALL. TIGHTEN LOCKING NUT "A" SECURELY. (DO NOT USE SUPPLIED WASHER)

DETAIL "F"



NOTES:
INSTALL TANT. CAP ON TOP OF CHIP CAPS AS SHOWN. KEEPING LEADS AS SHORT AS POSSIBLE. (SIDE VIEW)

DETAIL "D"
NOT TO SCALE

FOR BOM SEE: 1009161-501

QTY. REQD.	PART NO.	DESCRIPTION	MAT	FIN	MAT
		PARTS LIST			

DRAWN J.H.REED DATE 10 DEC 97
CHKD J.H.REED DATE 31 JULY 98
MECH J.HAGINN DATE 30 JULY 98
ELEC F.SCHIRK DATE 30 JULY 98
100S104
LABELED ON ASSEM.

AMPLIFIER RESEARCH

ASSEMBLY
QUAD AMP

DWG. NO. 1009161

SCALE | SHEET | REV

BILL NO: 1009161-501 REV: J U/M: EA DRAWING NO: ARC-A\1009161
PWB ASSY,QUAD AMP,100S1G4

SEQ	PART NUMBER	REV	D E S C R I P T I O N	U/M	QUANTITY-PER	DRAWING NUMBER	REF-DSGN
0010	1009163	E	SCHEM DIAG,QUAD AMP,100S1G4	EA	REF	ARC-C\1009163	
0020	1009161	F	ASSY DWG,QUAD AMP	EA	REF	ARC-D\1009161	
0400	27099		CAPR,FEED-THRU,FILT,2500PF,500V	EA	5.000	MET\51-719-011	C1 ,C4 C21 ,C22 C28
0410	27068		CAPR,ELECT,100uF,50VDC,AXIAL	EA	2.000	ICI\107TTA050M	C2 ,C26
0420	27039		CAPR,CHIP,CER,1000pF,10%,50V	EA	10.000	ATC\700B102MCA50X	C3 ,C5 C6 ,C9 C10 ,C11 C12 ,C15 C16 ,C20
0425	27251		CAPR,CHIP,0.039uF,20%,50V	EA	8.000	ATC\200B393MP50	C7 ,C8 C13 ,C14 C23 ,C24 C25 ,C27
0430	27024		CAPR,CHIP,5.1pF,0.5%,500V	EA	2.000	DIL\C17AH5R1D500NT	C17 ,C18
0450	27028		CAPR,CHIP,200pF,20%,300V	EA	2.000	DIL\C17AH201M3TXL	C29 ,C30
0460	27047		CAPR,TANT,1UF,50V	EA	1.000	MAL\TDC105K050WSE	C31
0470	27051		CAPR,TANT,33UF,35VDC,EPOXY	EA	2.000	AVX\TAP336K035HSB	C32 ,C33
0700	30044		DIODE,SW,30mA,SM	EA	1.000	D-K\MA704ACT-ND	CR1
1000	33003		LED,RED,T1 3/4(5mm)	EA	1.000	H-P\HLMP-3001-009	DS1
1500	41243		CONN,COAX,BULKHD JACK,SMA,(F)	EA	2.000	DTA\1321000K82165	J1 ,J2
1800	1007507-105		INDUCTOR,AIR WOUND,.125ID,28GA,2T	EA	2.000	ARC-A\1007507	L1 ,L2
1810	66251		WIRE,BUSS,TINNED COPPER,28 AWG	IN	A/R	WEI\9028	L5 ,L6
2500	54561		XSTR,NPN,GEN PURPOSE	EA	1.000	MOT\MMBT3904LT1	Q1
2510	54562		XSTR,PNP,GEN PURPOSE	EA	2.000	MOT\MMBT3906LT1	Q2 ,Q5
2520	1000034-182A	BL	XSTR,RF,PWR,GaAsFET,SELECTED	EA	2.000	ARC\1000034	Q3 ,Q4
2700	55715-R180J		RES,FXD,WW,0.18,5%,2W,TYPE SPH	EA	1.000		R1
2705	55647-1200J		RES,FXD,CHIP,120,5%,1/8W	EA	1.000	D-K\P120-ECT-ND	R2

BILL NO: 1009161-501 REV: J U/M: EA DRAWING NO: ARC-A\1009161
PWB ASSY,QUAD AMP,100S1G4

SEQ	PART NUMBER	REV	D E S C R I P T I O N	U/M	QUANTITY-PER	DRAWING NUMBER	REF-DSGN
2720	55647-1501F		RES,FXD,CHIP,1.5K,1%,1/8W	EA	2.000	D-K\P1.5K-FCT-ND	R3 ,R15
2730	55647-3301J		RES,FXD,CHIP,3.3K,5%,1/8W	EA	2.000	D-K\P3.3K-ECT-ND	R4 ,R8
2740	55724-2R70J		RES,FXD,WW,2.7,5%,11W	EA	2.000	OHM\90J2R7	R5 ,R16
2750	55647-6800J		RES,FXD,CHIP,680,5%,1/8W	EA	2.000	D-K\P680-ECT-ND	R6 ,R31
2760	55916		RES,VAR,CERMET,MULTITURN,TOP ADJ,500,10%,1W	EA	1.000	MEP\8024EKW-501	R7
2780	55647-4531F		RES,FXD,CHIP,4.53K,1%,1/8W	EA	2.000	D-K\P4.53K-FCT-ND	R9 ,R14
2790	55647-1101J		RES,FXD,CHIP,1.1K,5%,1/8W	EA	2.000	D-K\P1.1K-FCT-ND	R10 ,R12
2795	55647-1801J		RES,FXD,CHIP,1.8K,5%,1/8W	EA	3.000	D-K\P1.8K-ECT-ND	R11 ,R13 R27
2800	56072		RES,FXD,PRECISION,FLANGE,MOUNT,50	EA	2.000	RFP\RFP-20-50TP	R17 ,R18
2810	55647-51R0J		RES,FXD CHIP,51 OHM,1/8W,5%	EA	2.000	D-K\ P51-ECT-ND	R19 ,R20
2815	55647-1001J		RES,FXD,CHIP,1K,1/8,5%	EA	5.000	D-K\P1.0K-ECT-ND	R21 ,R22 R25 ,R26 R30
2820	55649-13R0J		RES,FXD,CHIP,13,5%,1W	EA	2.000	D-K\P13XCT-ND	R23 ,R24
2840	55647-3901J		RES,FXD,CHIP,3.9K,5%,1/8W	EA	1.000	D-K\P3.9K-ECT-ND	R28
2850	55647-5601J		RES,FXD,CHIP,5.6K,5%,1/8W	EA	1.000	D-K\P5.6K-ECT-ND	R29
3700	60033		INTEGRATED CKT,LINEAR,POS.,ADJ.V,2A	EA	1.000	SGS\L200CV	U1
3710	25046		COUPLER,90 DEG,HYBRID	EA	2.000	RFP\102-422-90-200	U2 ,U3
3720	60135		IC,LINEAR QUAD COMPARATOR,SM	EA	1.000	NSI\LM339AM	U4
4000	30043		DIODE,ZENER,4.7V,SM	EA	1.000	D-K\MA3047CT-ND	VR1
5000	1011262-101	A	PWB,QUAD AMP	EA	1.000	ARC-C\1011262	1
5010	1009165-101	-	HSG,QUAD AMP	EA	1.000	ARC-D\1009165	2
5020	1009164-101-M1	-	COVER,QUAD AMP	EA	1.000	ARC-C\1009164	3
5030	69358		CLIP,COMPNT,1.75"L,.333"W,.377"HT	EA	2.000	OHM\5908	4
5050	11166		SCREW,MACH,PAN HD,CROSS-REC,S/S,2-56 X .50	EA	8.000		6

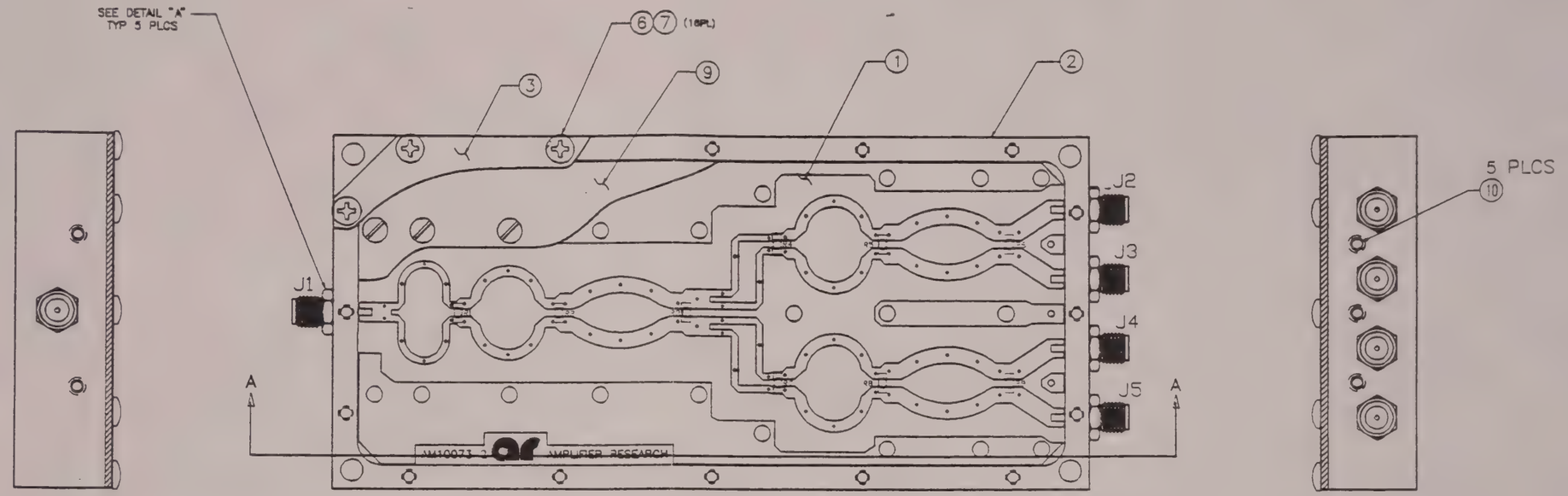
BILL NO: 1009161-501 REV: J U/M: EA DRAWING NO: ARC-A\1009161
PWB ASSY,QUAD AMP,100S1G4

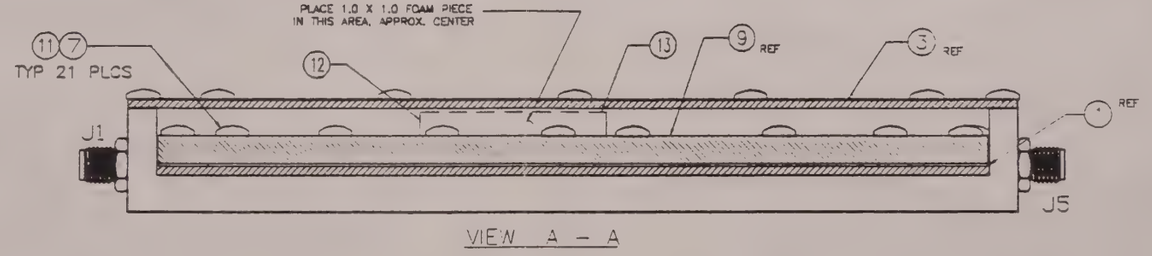
SEQ	PART NUMBER	REV	D E S C R I P T I O N	U/M	QUANTITY-PER	DRAWING NUMBER	REF-DSGN
5060	12005		WASH,LOCK,SPLIT,S/S,#2	EA	8.000	\MS35338-134	7
5070	11084		SCREW,MACH,PAN HD,CROSS-REC,S/S,2-56 X .18	EA	8.000	\MS51957-2	8
5080	11202		SEM,MACH SCREW,PHP W/SPLIT LK WASH,S.S.,4-40x.25	EA	41.000		9
5090	12047		WASH,LOCK,SPLIT,S/S,#4	EA	2.000	\MS35338-135	10
5100	12010		WASH,FLAT,S/S,#4,.250 OD X .125 ID X .022 THK	EA	23.000	\MS15795-803	11
5120	1007919-101	A	SHIELD,RF	EA	4.000	ARC-B\1007919	13
5130	69338		CONTACT,FINGER STOCK,TWIST GASKET,TIN PL	IN	A/R	I-S\OSG8-0559-17	14
5140	77064		COMPOUND,THERMAL JOINT,TYPE 120	OZ	A/R	WAK\120-S	15
5150	11095		SCREW,MACH,PAN HD,CROSS-REC,S/S,4-40 X .62	EA	2.000	\MS51957-18	16
5160	13013		NUT,HEX,S/S,4-40,.250AF	EA	2.000	\MS35649-244	17
5170	69332		FOAM,CONDUCTIVE	IN	A/R	MMM\2802	18
5180	77065		SEALANT,RTV,FLUOROSILE	OZ	A/R	G-E\730 RTV	19
5190	66027		WIRE,TFE,22 AWG,STRANDED,TYPE E,RED	EA	A/R		20
5200	66031		WIRE,TFE,22 AWG,STRANDED,TYPE E,BLU	EA	A/R		21
5210	66032		WIRE,TFE,22 AWG,STRANDED,TYPE E,VIO	EA	A/R		22
5220	66034		WIRE,TFE,22 AWG,STRANDED,TYPE E,WHT	EA	A/R		23
5230	1000643-403	C	CORE,FERRITE,BEAD,1/2 CMD5005	EA	9.000	ARC\1000643	24
5240	1011205-101	-	SHIM	EA	4.000	ARC-B\1011205	25
5250	66079		WIRE,TFE,22 AWG,STRANDED,TYPE E,WHT/RED	IN	A/R		26
5260	69319		CABLE TIES, 0.6 MAX BUNDLE DIA,2.8 L	EA	4.000	PNT\PLT.65MC	27

NOTICE TO PERSONS RECEIVING THIS DOCUMENT
THIS DOCUMENT IS THE PROPERTY OF AMPLIFIER RESEARCH AND THE DATA CONTAINED HEREIN SHALL BE MAINTAINED IN STRICT CONFIDENCE, AND NOT DISCLOSED, COPIED OR USED FOR MANUFACTURING OR SALE OF ANY PRODUCT WITHOUT PRIOR WRITTEN CONSENT OF AMPLIFIER RESEARCH.

ECN	DATE	BY
XXXXX	24NOV98	
XXXXX	30DEC98	
XXXXX	14APR99	
XXXXX	24MAY99	
REF	25MAY99	
10229	18OCT99	

RELEASE NO. 1196-03

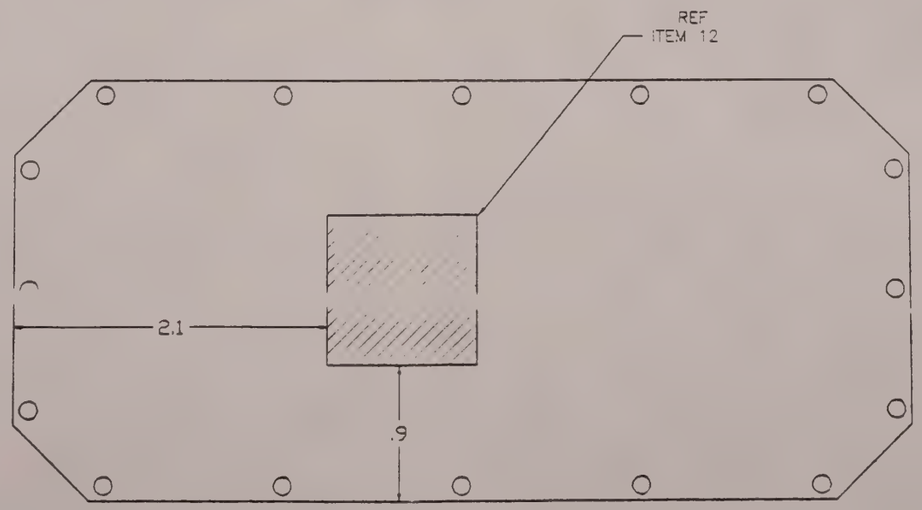




VIEW A – A

DETAIL "A"

TRIM TEFLON OF PARTS J1,J2,J3,J4, AND J5, FLUSH WITH CONNECTOR BODY. CUT CENTER PIN TO 0.075"(IN) INSTALL CONNECTOR FLUSH WITH INNER HOUSING WALL. TIGHTEN LOCKING NUT SECURELY. (DO NOT USE SUPPLIED WASHER)



COVER BOTTOM VIEW

NOTES:

1. INSTALL CONNECTORS (J1 THRU J5) ONTO HOUSING (ITEM 2).
2. INSTALL RESISTORS (R1 THRU R9) TO PWB (ITEM 1), THEN INSTALL PWB INTO HOUSING (ITEM 2) TEMPORAILY USING MTG HARDWARE (ITEMS 6 AND 7). CONN END'S ONLY.
3. SOLDER CENTER PINS OF CONECTORS (J1 THRU J5) TO PWB.
4. INSTALL INNER LID (ITEM 9) INTO HOUSING USING MTG HARDWARE (ITEMS 7 & 11).
5. INSTALL SET SCREWS (ITEM 10), INTO HOUSING 5 PLACES, TIGHTEN SECURELY.
6. INSTALL FOAM PIECE (ITEM 12), APPROX. WHERE SHOWN. APPLY RTV SEALANT P/N 77065 TO FOAM, ITEM 12. SECURE TO COVER LOCATED APPROX. AS SHOWN. CURE AT AMBIENT FOR 24 HRS.
7. PUT ALL MTG. HARDWARE (ITEMS 6 AND 7) IN TOP COVER. COVER WILL NOT BE REMOVED ONCE IT IS PLACED ON HOUSING.

FOR BOM, SEE 1010072-501

ITEM	QTY. REQD.	PART NO.	DESCRIPTION	MARK	FSN
			PARTS LIST		

UNLESS OTHERWISE SPECIFIED
DO NOT SCALE DRAWING
DIMENSIONS ARE IN INCHES AND MILLIMETERS
TOLERANCES
ALL THREADS ARE UNIFIED NATIONAL
REMOVE ALL BURRS AND SHARP EDGES

BASIC DIMENSIONS	2 PLACE DECIMALS	3 PLACE DECIMALS
UP TO 6	± .02	± .005
ABOVE 6 TO 24	± .03	± .010
ABOVE 24	± .05	± .015

ANGULAR DIMENSIONS ± 1°

DRAWN J.H.REED DATE 04 NOV 98
CHKD J.H.REED DATE 28 MAY 99
MECH J.MAGINN DATE 18 JUNE 99
ELEC F.SCHIRK DATE 02 JUNE 99

AMPLIFIER RESEARCH

ASSEMBLY DRAWING
4 WAY SPLITTER

DWG. NO. 1010072

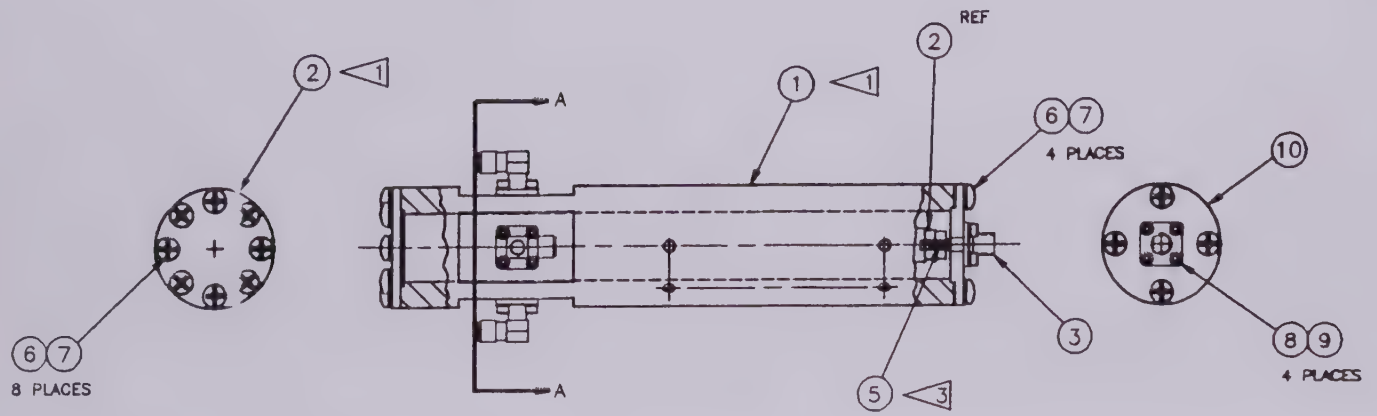
USED ON MODEL 1005104

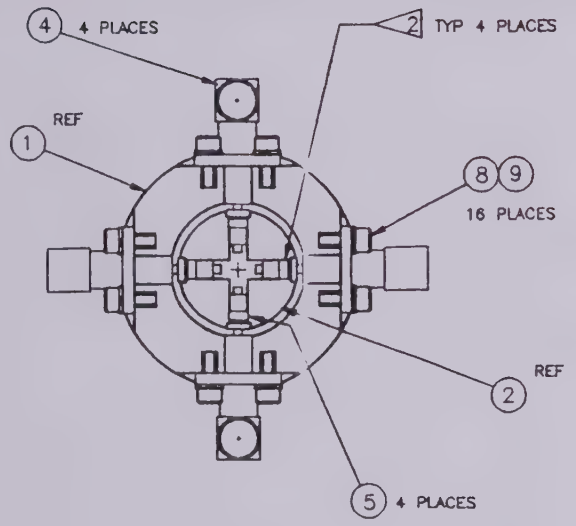
SCALE 2/1 SHEET 1 OF 1 REV A

BILL NO: 1010072-501 REV: A U/M: EA DRAWING NO: ARC-C\1010072
PWB ASSY,4 WAY SPLITTER #3

SEQ	PART NUMBER	REV	D E S C R I P T I O N	U/M	QUANTITY-PER	DRAWING NUMBER	REF-DSGN
0010	1010072	A	ASSY DWG,4 WAY SPLITTER #3	EA	REF	ARC-C\1010072	
0020	1010074	-	SCHEM DIAG,4 WAY SPLITTER #3	EA	REF	ARC-B\1010074	
1500	41243		CONN,COAX,BULKHD JACK,SMA,(F)	EA	5.000	DTA\1321000K82165	J1 ,J2 J3 ,J4 J5
2700	55651-1200J		RES,FXD,CHIP,120,5%,1/4W	EA	3.000	D-K\P120VCT-ND	R1 ,R4 R7
2710	55651-2200J		RES,FXD,CHIP,220,5%,1/4W	EA	3.000	D-K\P220VCT-ND	R2 ,R5 R8
2720	55651-2700J		RES,FXD,CHIP,270,5%,1/4W	EA	3.000	D-K\P270VCT-ND	R3 ,R6 R9
5000	1010073-101	A	PWB,4 WAY SPLITTER #3	EA	1.000	ARC-B\1010073	1
5010	1010075-101	-	HSG,4 WAY SPLITTER #3	EA	1.000	ARC-B\1010075	2
5020	1008122-101	-	COVER,4 WAY SPLITTER	EA	1.000	ARC-B\1008122	3
5040	11010		SCREW,MACH,PAN HD,CROSS-REC,S/S,4-40 X .25	EA	16.000	\MS51957-13	6
5050	12047		WASH,LOCK,SPLIT,S/S,#4	EA	37.000	\MS35338-135	7
5070	1010076-101	-	LID,INNER,4 WAY SPLITTER #3	EA	1.000	ARC-B\1010076	9
5080	11183		SET SCREW,HEX SOCKET,CUP PT,S/S,6-32 X .19	EA	5.000		10
5090	11011		SCREW,MACH,PAN HD,CROSS-REC,S/S,4-40 X .38	EA	21.000	\MS51957-15	11
5100	69332		FOAM,CONDUCTIVE	IN	A/R	MMM\2802	12
5110	77065		SEALANT,RTV,FLUOROSILE	OZ	A/R	G-E\730 RTV	13

REL 1135-02





SECTION A-A
SCALE 2=1

NOTES:

1. THOROUGHLY DE-GREASE ITEMS 1 & 2 BEFORE ASSEMBLY.
2. PRESS ITEM 5 INTO ITEM 2, 4 PLACES, USING ARBOR PRESS WITH SUITABLE TOOL. FLANGE OF ITEM 5 SHOULD BOTTOM IN .140 DIA C'BORE OF ITEM 2. DO NOT DEFORM PIN RECEPTACLE SHELL OR INTERNAL FINGERS.
3. PRESS ITEM 5 INTO ITEM 2, USING ARBOR PRESS WITH SUITABLE TOOL. FLANGE OF ITEM 5 SHOULD BOTTOM ON ITEM 2. DO NOT DEFORM PIN RECEPTACLE SHELL OR INTERNAL FINGERS

SEE BOM 1008056-501

ITEM	QTY. REQD.	PART NO.	DESCRIPTION	MARK	FIN	MATL
		PARTS LIST				

DRAWN C. BICKELHAUPT DATE 23 MAY 96
CHKD C. BICKELHAUPT DATE 23 MAY 96
MECH
ENGR
ELEC
QUAL

MINUTEMAN RESEARCH

COMBINER/SPLITTER ASSY, 4 WAY

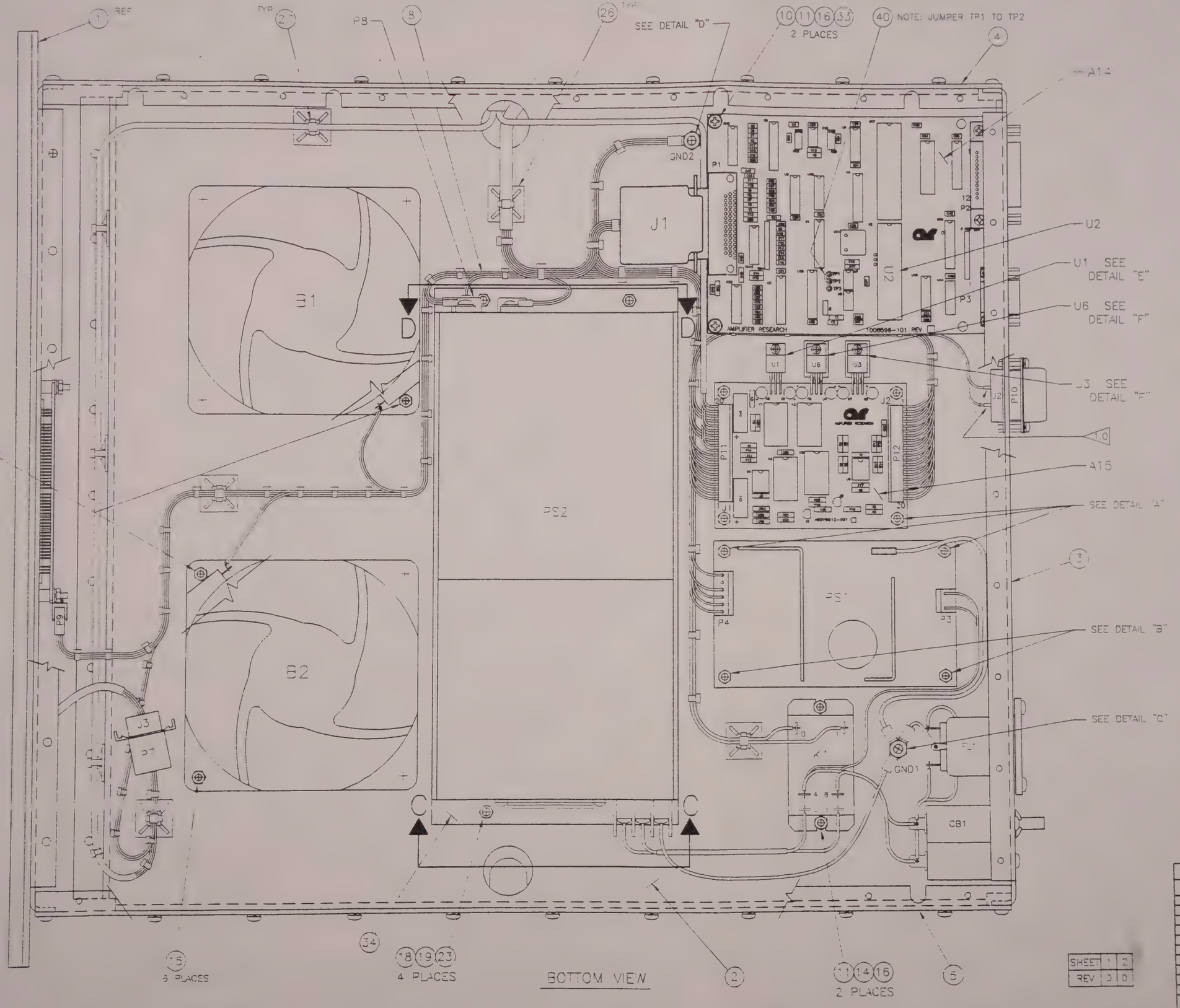
PART NO. 1008056

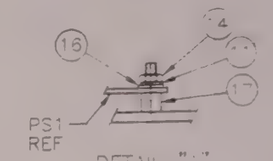
USED ON MODEL 2S104

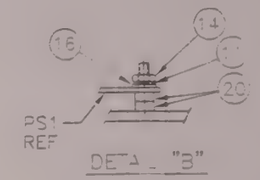
SCALE 1/1 SHEET 1 OF 1 REV —

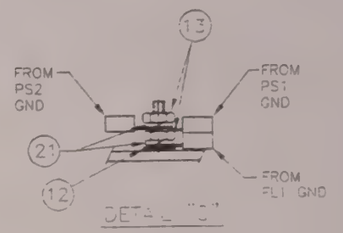
BILL NO: 1008056-501 REV: A U/M: EA DRAWING NO: ARC-C\1008056
COMBINER ASSY,4 WAY

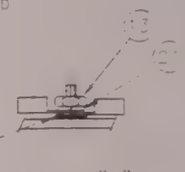
SEQ	PART NUMBER	REV	D E S C R I P T I O N	U/M	QUANTITY-PER	DRAWING NUMBER	REF-DSGN
0010	1008056	-	ASSY DWG,COMBINER ASSY, 4 WAY	EA	REF	ARC-C\1008056	
5000	1008057-101	B	BODY,4 WAY COMBINER	EA	1.000	ARC-C\1008057	1
5010	1008058-101	C	XFMR,STEPPED,4 WAY COMBINER	EA	1.000	ARC-D\1008058	2
5015	1008051-102	-	MOD DWG,SMA CONN	EA	1.000	ARC-A\1008051	3
5020	1008051-101	-	MOD DWG,SMA CONN	EA	4.000	ARC-A\1008051	4
5040	41230		RECEPT,PIN,.048-.064 DIA X.200LG	EA	5.000	MLX\	5
5050	11015		SCREW,MACH,PAN HD,CROSS-REC,S/S,6-32 X .31	EA	12.000	\MS51957-27	6
5060	12048		WASH,LOCK,SPLIT,S/S,#6	EA	12.000	\MS35338-136	7
5070	11155	-	SCREW,CAP,SOCKET HD,S/S,2-56 X .187	EA	20.000		8
5080	12005		WASH,LOCK,SPLIT,S/S,#2	EA	16.000	\MS35338-134	9
5090	1008049-101	A	PLATE,CONN MTG	EA	1.000	ARC-B\1008049	10

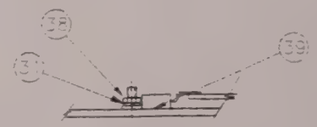


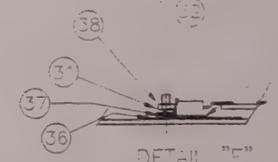












NOTES:
1.0 ADD SHRINK TUBING ON J2 WIRES
2.0 CONNECTOR COVERS ON P3, P4, P11 AND P12 HAVE A DIRECTION, "DO NAME" SHOULD BE AT PIN 1

FOR BOM SEE 1009510-501

ITEM	QTY. REQD.	PART NO.	DESCRIPTION	MARK	FIN	MATL
			PARTS LIST			

UNLESS OTHERWISE SPECIFIED
DO NOT SCALE DRAWING
DIMENSIONS ARE IN INCHES AND INCLUDE PLATING THICKNESS
ALL THREADS ARE UNIFIED NATIONAL (UNRC, UNJC)
REMOVE ALL BURRS AND SHARP EDGES

BASIC DIMENSIONS	2 PLACE DECIMALS	3 PLACE DECIMALS
.9 TO 6	±.02	±.008
OVER 6 TO 24	±.03	±.010
OVER 24	±.05	±.015

ANGULAR DIMENSIONS ±2°

DRAWN	C. SWYNN	DATE 29 APR 98
CHKD	M. BICKELMAN	DATE 27 JUL 98
MECH	J. WAGNIN	DATE 30 JUL 98
ELEC	J. BANKERT	DATE 29 JUL 98

AMPLIFIER RESEARCH

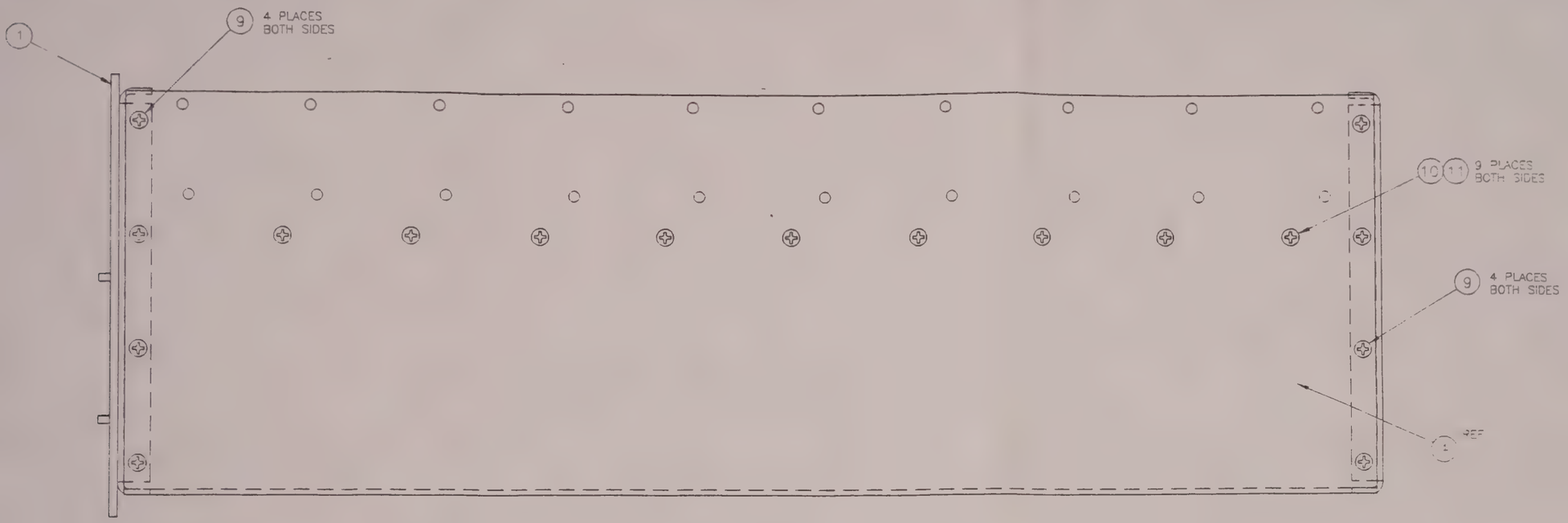
PS ASSY

DWG. NO. 1009510

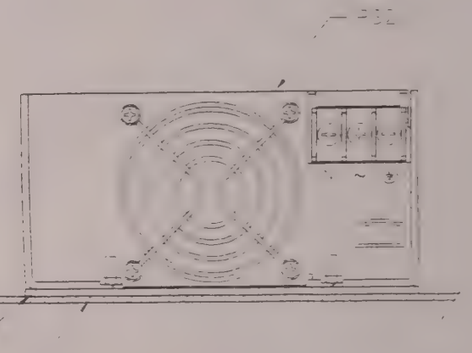
SCALE | SHEET OF | REV

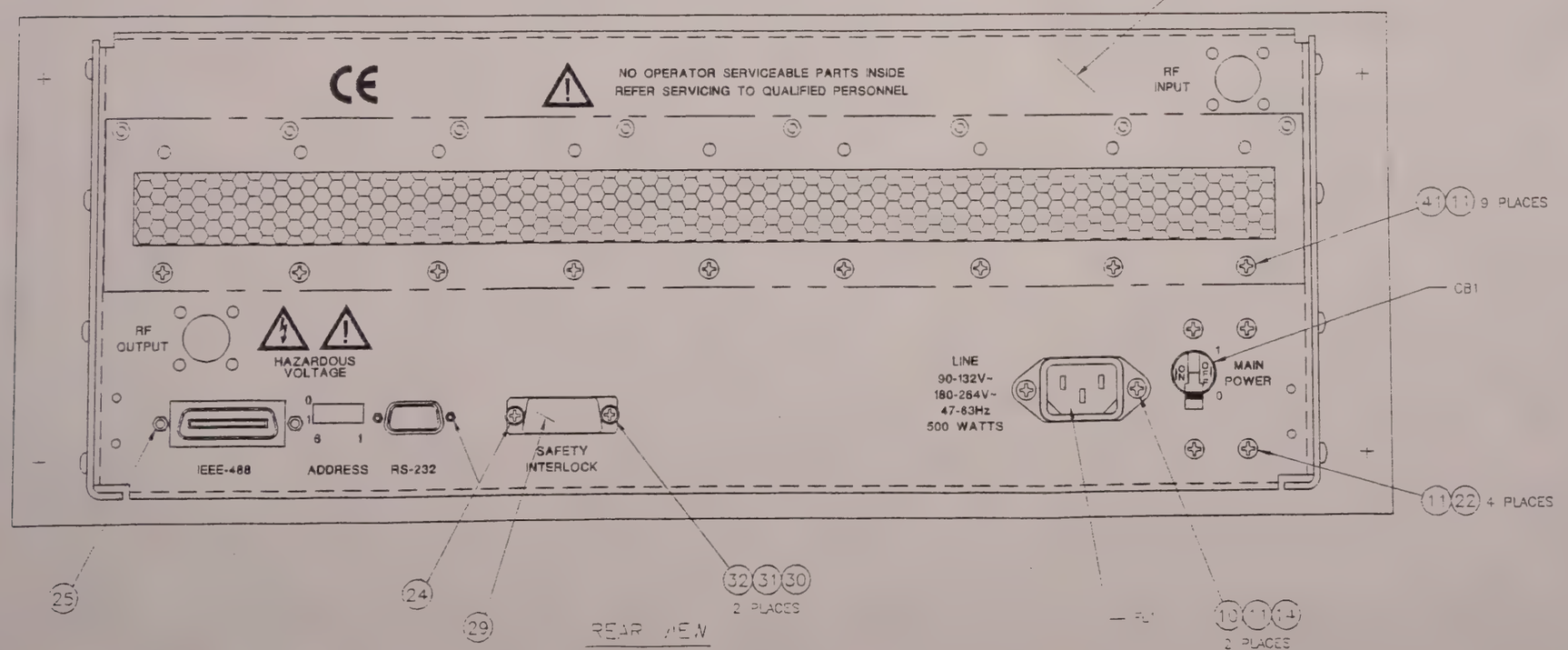
SHEET	1	2
REV	D	D

USED ON MODEL 255104A

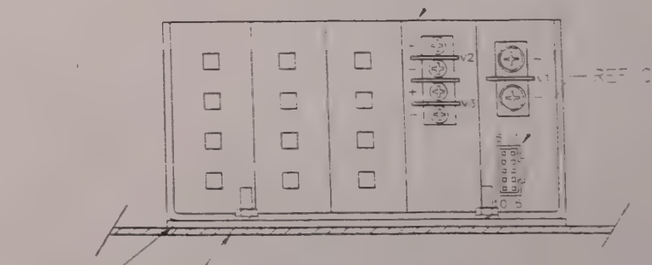


RIGHT SIDE VIEW





REAR VIEW



SECTION D-D

DWG. NO.	1009510	REV
SCALE	SHEET	

BILL NO: 1009510-501 REV: C U/M: EA DRAWING NO: ARC-D\1009510
PS ASSY

SEQ	PART NUMBER	REV	D E S C R I P T I O N	U/M	QUANTITY-PER	DRAWING NUMBER	REF-DSGN
0010	1009506	C	BLOCK DIAG,MODEL 25S1G4A	EA	REF	ARC-C\1009506	
0020	1009510	D	ASSY DWG,PS ASSY	EA	REF	ARC-D\1009510	
0100	1008595-501	C	PWB ASSY,OPERATE/CONTROL(OCB)	EA	1.000	ARC-C\1008595	A14
0110	1009512-501	-	REG CTRL BD ASSY	EA	1.000	ARC-C\1009512	A15
0200	37020	-	FAN,AXIAL,24 VDC,106 CFM,	EA	2.000	PAM\4124KX	B1 ,B2
0600	35088		CKT BRKR,2 POLE,10A,QUICK-CONN. TERM.	EA	1.000	AIR\11162F10.0-01	CB1
1400	35019		FILT,LINE,6 AMP	EA	1.000	COR\6EF1	FL1
1700	43046		RELAY,MED PWR,12VDC COIL,30A CONTACT RATING	EA	1.000	DIGIKEY\PB298-ND	K1
2400	25066		PS,SWNG,85-264VAC,TRIPLE OUT,+5V,+12V,-12V,25W	EA	1.000	CPI\NFS25-7608	PS1
3700	60046		INTEGRATED CKT,3 TERM,POS REG.	EA	1.000	MOT\MC7815CT	U1
3720	60066		IC,3 TERM,NEG REG	EA	1.000	MOT\MC7905CT	U3
3730	60048		INTEGRATED CKT,3 TERM,NEG REG.	EA	1.000	MOT\MC7915CT	U6
5000	1009662-501	D	CTRL PNL ASSY	EA	1.000	ARC-D\1009662	1
5010	1009522-301	A	CHASSIS	EA	1.000	ARC-D\1009522	2
5020	1009523-301-M1	A	PNL,REAR	EA	1.000	ARC-D\1009523	3
5030	1008113-101	-	PNL,SIDE, RIGHT	EA	1.000	ARC-D\1008113	4
5040	1008114-101	-	PNL,SIDE LEFT	EA	1.000	ARC-D\1008114	5
5070	1009514-501	C	HARNESS ASSY,PS	EA	1.000		8
5080	11137		SCREW,MACH,PAN HD,CROSS-REC,S/ZN,6-32X.31,TYPE SW	EA	16.000		9
5090	11016		SCREW,MACH,PAN HD,CROSS-REC,S/S,6-32 X .38	EA	22.000	\MS51957-28	10
5100	12048		WASH,LOCK,SPLIT,S/S,#6	EA	43.000	\MS35338-136	11
5110	12059		WASH,LOCK,EXT TOOTH,S/S,#10	EA	2.000	\MS35335-60	12
5120	13007		NUT,HEX,S/S,10-32,.343AF	EA	3.000		13
5130	13004		NUT,HEX,S/S,6-32,.250AF	EA	11.000		14

BILL NO: 1009510-501 REV: C U/M: EA DRAWING NO: ARC-D\1009510
PS ASSY

SEQ	PART NUMBER	REV	D E S C R I P T I O N	U/M		QUANTITY-PER	DRAWING NUMBER	REF-DSGN
5140	13024		NUT,SELF-LOCK,HEX,REG HT,NYLON INSERT,S/S,4-40	EA		6.000	\MS21044C04	15
5150	12011		WASH,FLAT,S/S,#6,.312 OD X .156 ID X .035 THK	EA		12.000	\MS15795-805	16
5160	14018		SPACER,HEX,THD,F,B W/NI,1/4 HEX X 1/4 LG X 6-32	EA		6.000	KEY\1451A	17
5170	13005		NUT,HEX,S/S,8-32,.250AF	EA		4.000		18
5180	12049		WASH,LOCK,SPLIT,S/S,#8	EA		4.000	\MS35338-137	19
5190	12044		WASH,FLAT,NYLON,.312 OD X .140 ID X .125 THK	EA		4.000	MIP\16FW006125	20
5200	12050		WASH,LOCK,SPLIT,S/S,#10	EA		3.000	\MS35338-138	21
5210	11014		SCREW,MACH,PAN HD,CROSS-REC,S/S,6-32 X .25	EA		4.000	\MS51957-26	22
5220	12012		WASH,FLAT,S/S,#8,.375 OD X .188 ID X .049 THK	EA		4.000	\MS15795-807	23
5230	69262		SCREWLOCK KIT,F,USE WITH METAL SHELL"D"CONN	EA		2.000	AMP\207952-1	24
5240	69375	-	SCREWLOCK KIT,METRIC,IEEE-488	EA		1.000	AMP\554808-1	25
5250	69238	-	BASE,MTG,CABLE TIE,ADH BACK,3/4 X 3/4	EA	A/R		TAB\TC-344A	26
5260	69161		CABLE TIES,1 3/8 MAX BUNDLE DIA,5 5/8 L	EA	A/R		PNT\PLT1.5MP	27
5280	69393		SWITCHING SHELL,15 PIN SUBMIN"D"	EA		1.000	CIN\DA19678-6	29
5290	11010		SCREW,MACH,PAN HD,CROSS-REC,S/S,4-40 X .25	EA		2.000	\MS51957-13	30
5300	12047		WASH,LOCK,SPLIT,S/S,#4	EA		5.000	\MS35338-135	31
5310	12010		WASH,FLAT,S/S,#4,.250 OD X .125 ID X .022 THK	EA		2.000	\MS15795-803	32
5320	14030		SPACER,HEX,THD,F,A W/YEL IRID,1/4HEX X 2.00 X 6-32	EA		2.000	HHS\2214	33
5330	1009666-501	-	PS SUB ASSY	EA		1.000	ARC-C\1009666	34
5340	69090		INSUL,HD ANODIZED,TYPE TO-220,.950 L,.500 W	EA		2.000	THM\4777A	36
5350	12037		WASH,SHLDR,N,.232 OD X .115 ID X .047 SHLD.THK.	EA		1.000	REL\NY-04-040	37
5360	13003		NUT,HEX,S/S,4-40,.187AF	EA	A/R			38
5370	77064		COMPOUND,THERMAL JOINT,TYPE 120	EA	A/R		WAK\120-S	39
5380	66047		WIRE,BUSS,TINNED COPPER,22 AWG	IN	A/R		ALP\9022	40

BILL NO: 1009510-501 REV: C U/M: EA DRAWING NO: ARC-D\1009510
PS ASSY

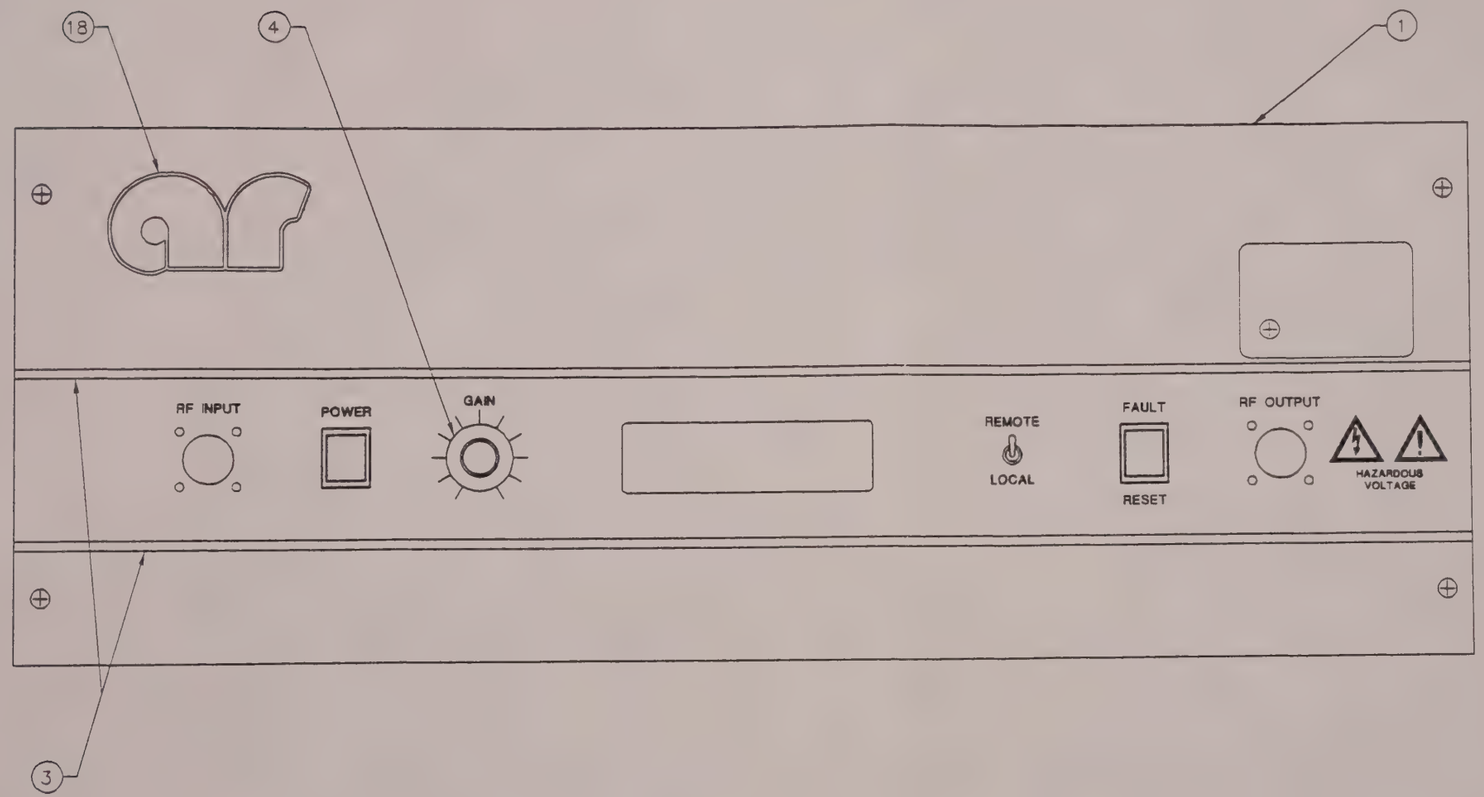
SEQ	PART NUMBER	REV	D E S C R I P T I O N	U/M	QUANTITY-PER	DRAWING NUMBER	REF-DSGN
5390	11020		SCREW,MACH,PAN HD,CROSS-REC,S/S,6-32 X .50	EA	9.000	\MS51957-30	41

BILL NO: 1009514-501 REV: C U/M: EA DRAWING NO:
HARNESS ASSY,PS

SEQ	PART NUMBER	REV	D E S C R I P T I O N	U/M	QUANTITY-PER	DRAWING NUMBER	REF-DSGN
0010	1009517	E	WIRE LIST,PS ASSY	EA	REF	ARC-A\1009517	
0015	1009516	B	WIRE LIST,AMP ASSY	EA	REF	ARC-A\1009516	
0020	1009506	C	BLOCK DIAG,MODEL 25S1G4A	EA	REF	ARC-C\1009506	
0030	1009520-101	1	HARNESS BD,PS 25S1G4A	EA	REF		
2200	41246		CONN,PLUG,44PIN,M	EA	1.000	AMP\748366-1	J1
2210	41131		CONN,RECEPT,W/EARS & DETENT LOCK,9 CKT,M	EA	1.000	MOL\03-09-1092	P7
2210	41244		TERM,CRIMP,TYP,M,20-28AWG	EA	38.000	AMP\748333-7	J1
2220	41105		TERM,.093 DIA,CRIMP TYPE,F,18-22 AWG	EA	5.000	MOL\02-09-1119	P7
2220	41272		CONN HOOD,CABLE CLAMP,PLASTIC,44 PIN	EA	1.000	AMP\207345-1	J1
2230	41158		CONN,SUBMINI "D",FILTD,15 PIN,(F)	EA	1.000	AMH\FCC17A15SM340	J2
2240	41075		CONN,PLUG,6 PIN,(F)	EA	2.000	PNT\CT156F22-6-C	P1 ,P4
2250	41060		CONN,THRU COVER,6 PIN	EA	2.000	PNT\TC156F-6-C	P1 ,P4
2250	41074		CONN,PLUG,3 PIN(F)	EA	1.000	PNT\CT156F22-3-C	P2
2260	41059		CONN,THRU COVER,3 PIN	EA	2.000	PNT\TC156F-3-C	P2 ,P3
2270	41182		CONN,PLUG,3 PIN,(F),18 AWG	EA	1.000	PNT\CT156F18-3	P3
2330	41215		CONN,RECEPT,10 CKT,W/CONTACTS	EA	1.000	AST\70-841-004	P8
2340	41280		CONN,PLUG,14 POS	EA	1.000	BEG\69176-014	P9
2350	41267		TERM,.025 SQUARE,CRIMP TYPE,F,22-26 AWG	EA	14.000	BEG\47747-000	P9
2360	41166		CONN,SUBMINI"D",NON-FILTD,15 PIN (M)	EA	1.000	AMH\117DA15P	P10
2370	41188		CONN,PLUG,20 PIN,(F)	EA	2.000	PNT\CT100F22-20-Q	P11 ,P12
2380	41189		COVER,CONN,20 PIN	EA	2.000	PNT\TC100F-20-Q	P11 ,P12
5000	66130		TUBING,PVC,BLK,.312 ID,.025 WALL THK	IN	A/R		
5010	69145		TERM,RING,INSUL,#10 STUD,16-14 AWG	EA	3.000	TAB\RB-877	
5020	69136		TERM,INSUL,PUSH-ON,F,16-14 AWG,.032 X .250 TAB	EA	6.000	TAB\RB-257	

BILL NO: 1009514-501 REV: C U/M: EA DRAWING NO:
HARNESS ASSY,PS

SEQ	PART NUMBER	REV	D E S C R I P T I O N	U/M	QUANTITY-PER	DRAWING NUMBER	REF-DSGN
5030	69323		TERM,INSUL,PUSH-ON,F,22-18 AWG,.020 X .110 TAB	EA	4.000	TAB\RA18-111F	
5050	69137		TERM,INSUL,PUSH-ON,F,22-18 AWG,.032 X .250 TAB	EA	2.000	TAB\RA-257	
5060	69140		TERM,RING,INSUL,#6 STUD,22-16 AWG	EA	3.000	TAB\RA-857	
5070	69143		TERM,RING,INSUL,,#6 STUD,16-14 AWG	EA	4.000	TAB\RB-857	
5080	69146		TERM,RING,INSUL,#10 STUD,10 AWG	EA	3.000	TAB\RC-367	
5090	41299		TERM,.093 DIA,CRIMP,TYPE F,24-30AWG	EA	3.000	MOL\02-09-1144	
5100	41175		TERM,.093 DIA,CRIMP TYPE,F,14-20 AWG	EA	1.000	MOL\02-09-1104	
5110	66116		TUBING,SHRINK,BLK,.093 EXP,.046 REC	IN	A/R	REM\F-P301	
5120	69138		TERM,INSUL,PUSH-ON,F,12-10 AWG,.032 X .250 TAB	EA	2.000	TAB\RC-257	



SHEET	1	2
REV	D	D

FOR BOM SEE 1009662-501

ITEM	QTY. REQD.	PART NO.	DESCRIPTION	MARK	FIN	MATL
		PARTS LIST				

UNLESS OTHERWISE SPECIFIED
DO NOT SCALE DRAWING
DIMENSIONS ARE IN INCHES AND INCLUDE PLATING THICKNESS
ALL THREADS ARE UNIFIED NATIONAL STANDARD, CLASS 2
REMOVE ALL BURRS AND SHARP EDGES

BASIC DIMENSIONS	3 PLACE DECIMALS	3 PLACE DECIMALS
.XX TO 6	±.03	±.030
ABOVE 6 TO 24	±.08	±.010
ABOVE 24	±.25	±.015
ANGULAR DIMENSIONS ±1/2°		

DRAWN: C. GWYNN, DATE 27 NOV 97
CHKD: M. BICKELMAN, DATE 27 JUL 98
MECH: J. MACINN, DATE 30 JUL 98
ELEC: J. BANKERT, DATE 28 JUL 98

amplifier research

CONTROL PANEL ASSY

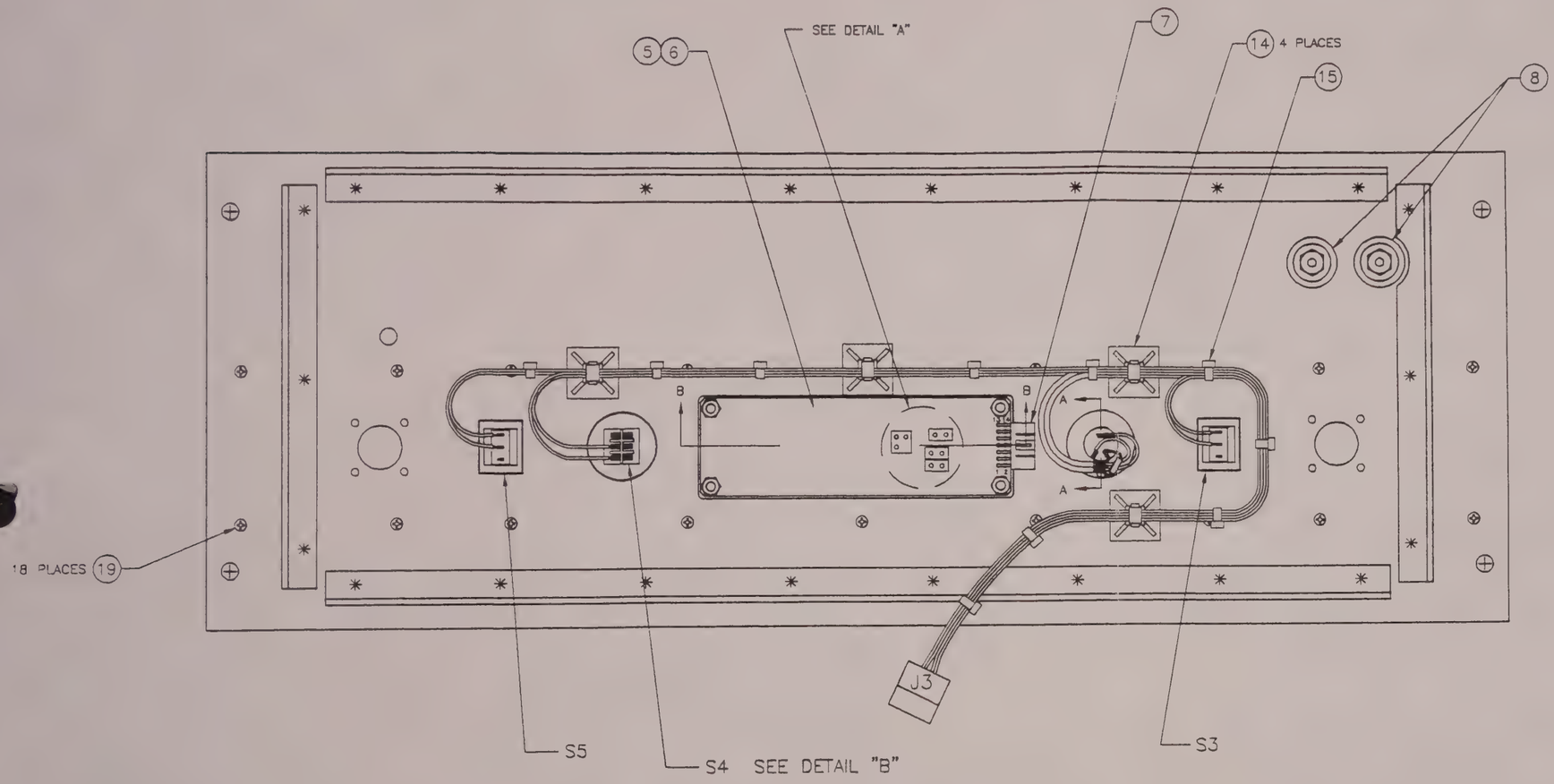
DWG. NO. 1009662

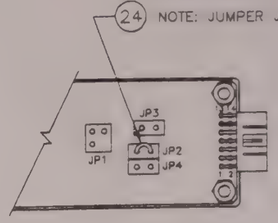
SCALE 1/1 | SHEET 1 OF 2 | REV. SEE BLOCK

2SS104A
USED ON MODEL

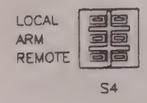
REV	DATE	
3521	98JUL24	
3549	98AUG12	A
9829	05MAY09	
10071	06JUN09	
10653	09MAY09	

1176-01

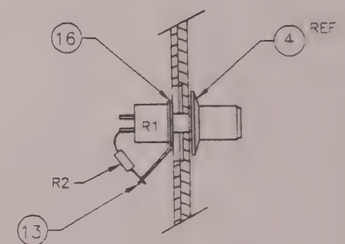




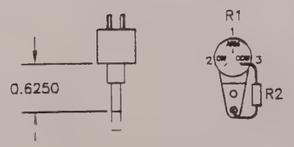
DETAIL "A"



DETAIL "B"

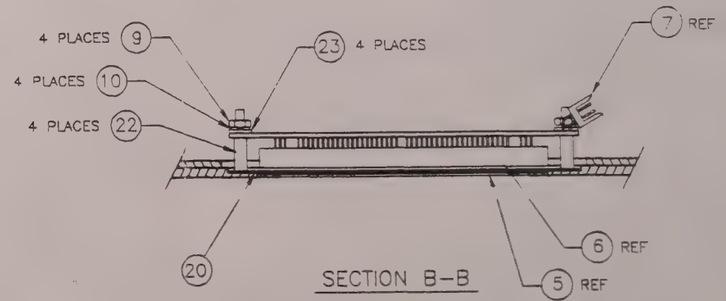


SECTION A-A



DETAIL OF R1

THE SHAFT OF R1 MUST BE TRIMMED IF IT IS GREATER THAN .625" FROM THE BASE OF THE THREADED SHOULDER. DO NOT TRIM TO LESS THAN .625".



SECTION B-B

NOTE: ITEM 5, FILTER, MUST HAVE THE FLAT (NON-SHINEY) SIDE DISPLAYING TO THE OUTSIDE.

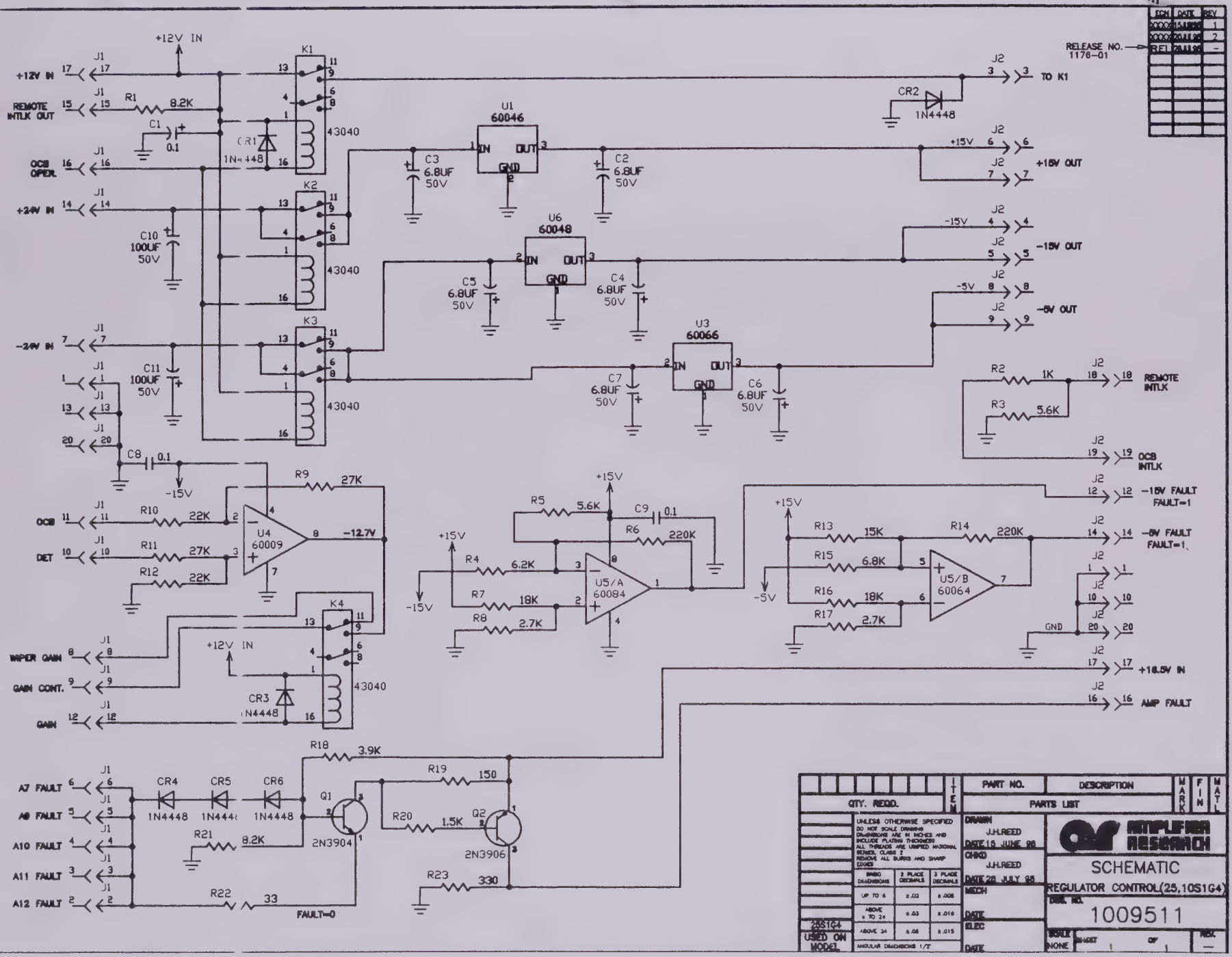
DWG NO.	1009662	
SCALE 1/1	SHEET 2 OF 2	REV

BILL NO: 1009662-501 REV: D U/M: EA DRAWING NO: ARC-D\1009662
CTRL PNL ASSY

SEQ	PART NUMBER	REV	D E S C R I P T I O N	U/M	QUANTITY-PER	DRAWING NUMBER	REF-DSGN
0010	1009662	D	ASSY DWG,CTRL PNL ASSY	EA	REF	ARC-D\1009662	
0020	1009515	A	WIRE LIST,CTRL PNL	EA	REF	ARC-A\1009515	
1500	41103		CONN,PLUG,9 PIN	EA	1.000	MOL\03-09-2092	J3
1505	41176		TERM,.093 DIA,CRIMP TYPE,M,14-20 AWG	EA	1.000	MOL\02-09-2103	J3
1510	41107		TERM,.093 DIA,CRIMP TYPE,M,18-22 AWG	EA	8.000	MOL\02-09-2118	J3
2700	55901	-	RES,VAR,CP,10K,10%,1/2W	EA	1.000	CLA\RV6NAYSA103A	R1
2710	55612-1202J	-	RES,FXD,METAL FILM,12K,5%,1/4-1/2W	EA	1.000	TRW\GP55-1202+/-5%	R2
3100	57089	-	SW,PB,MOM.SPDT(N.O.)	EA	2.000	CKS\8121J81ZGE22	S3 .S5
3110	57042		SW,TOGGLE,MINI,DPDT,5A,125VAC	EA	1.000	A-S\MST-205N	S4
5000	1009526-301-F1-M1	C	PNL,CTRL	EA	1.000	ARC-D\1009526	1
5020	1008867-101-F2	-	RAIL,TRIM	EA	2.000	ARC-C\1008867	3
5030	69018		KNOB,SKIRTED,1/8"SHAFT,MATTE FINISH	EA	1.000	ROG\MF-RB-67-0SK7M	4
5040	1009173-101	B	FILTER,AMBER,2 LINE DISPLAY	EA	1.000	ARC-B\1009173	5
5050	69384		DISPLAY,VAC FLUORESCENT,2 ROWS,20 CHARACTERS	EA	1.000	NOR\CU20025ECPBU1J	6
5060	41279		CONN,HEADER,R/A,14 POS	EA	1.000	BEG\78207-114	7
5070	14048	-	FASTENER,PALNUT,WASH TYPE,SELF THDG,.125 DIA	EA	2.000	MCS\90533A131	8
5080	13003		NUT,HEX,S/S,4-40,.187AF	EA	4.000		9
5090	12047		WASH,LOCK,SPLIT,S/S,#4	EA	4.000	\MS35338-135	10
5120	69242		LUG,SHAKEPROOF,13/16 L,#1/4 STUD,DUAL HOLE	EA	1.000	HHS\1410-14	13
5130	69238	-	BASE,MTG,CABLE TIE,ADH BACK,3/4 X 3/4	EA	3.000	TAB\TC-344A	14
5140	69161		CABLE TIES,1 3/8 MAX BUNDLE DIA,5 5/8 L	EA	A/R	PNT\PLT1.5MP	15
5150	12060		WASH,LOCK,EXT TOOTH,S/S,#1/4	EA	1.000	\MS35335-61	16
5170	1006659-101	A	LOGO,DIECAST,1.25	EA	1.000	ARC-B\1006659	18
5180	11167		SCREW,MACH,FLT HD,100 DEG,CROSS-REC,S/S,2-56X.188	EA	18.000		19

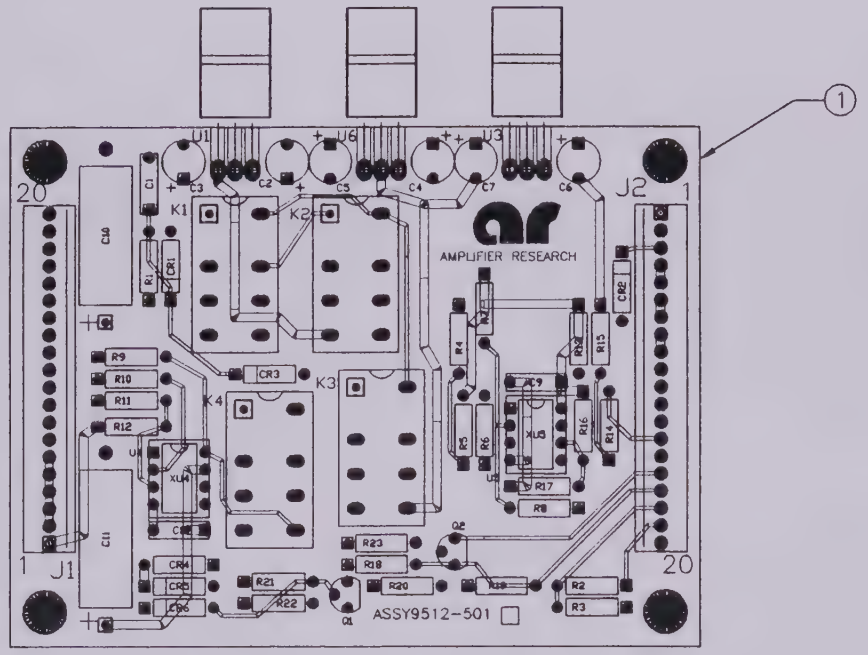
BILL NO: 1009662-501 REV: D U/M: EA DRAWING NO: ARC-D\1009662
CTRL PNL ASSY

SEQ	PART NUMBER	REV	D E S C R I P T I O N	U/M	QUANTITY-PER	DRAWING NUMBER	REF-DSGN
5210	14056		SPACER,RND,ALUM,.125 ID X .167 OD X .437 LG	EA	4.000	KEY\401	22
5220	12010		WASH,FLAT,S/S,#4,.250 OD X .125 ID X .022 THK	EA	4.000	\MS15795-803	23
5230	66047		WIRE,BUSS,TINNED COPPER,22 AWG	IN	A/R	ALP\9022	24
5240	1010628-101	-	RETAINER,FILTER	EA	1.000	ARC-B\1010628	20


+12V IN
+12V IN
REMOTE INTLK OUT
OCB OPER.
+24V IN
-24V IN
OCB
DET
WIPER GAIN
GAIN CONT.
GAIN
A7 FAULT
A8 FAULT
A10 FAULT
A11 FAULT
A12 FAULT
R1 8.2K
C1 0.1
CR1 1N4448
K1
K2
K3
K4
43040
C10 100UF 50V
C11 100UF 50V
C8 0.1
-15V
R9 27K
R10 22K
R11 27K
R12 22K
U4 60009
-12.7V
CR3 1N4448
U1 60046
C3 6.8UF 50V
C2 6.8UF 50V
U6 60048
C5 6.8UF 50V
C4 6.8UF 50V
U3 60066
C7 6.8UF 50V
C6 6.8UF 50V
CR2 1N4448
TO K1
+15V
+15V OUT
-15V
-15V OUT
-5V
-5V OUT
R2 1K
R3 5.6K
REMOTE INTLK
OCB INTLK
R5 5.6K
C9 0.1
R6 220K
R4 6.2K
R7 18K
R8 2.7K
U5/A 60084
R13 15K
R14 220K
R15 6.8K
R16 18K
R17 2.7K
U5/B 60064
GND
-15V FAULT FAULT=1
-5V FAULT FAULT=1
+16.5V IN
AMP FAULT
CR4 1N4448
CR5 1N4448
CR6 1N4448
R18 3.9K
R19 150
R20 1.5K
R21 8.2K
R22 33
R23 330
Q1 2N3904
Q2 2N3906
FAULT=0
RELEASE NO. 1176-01
ECN
DATE
REV
PART NO.
DESCRIPTION
PARTS LIST
QTY. REQD.
ITEM
MARK
FIN
MATL
DRAWN J.H.REED DATE 16 JUNE 98
CHKD J.H.REED DATE 26 JULY 98
MECH DATE
ELEC DATE
USED ON MODEL 25S1G4
MINUTEMAN RESEARCH
SCHEMATIC
REGULATOR CONTROL(25,10S1G4)
DWG. NO. 1009511
SCALE NONE
SHEET 1 OF 1
REV —

ECN	DATE	REV
000073	JUNE 98	1
REL	28JUL98	-

RELEASE NO. 1178-01



FOR BOM: SEE 1009512-501

QTY. REQD.	ITEM	PART NO.	DESCRIPTION	MARK	FIN	MATL
		PARTS LIST				

UNLESS OTHERWISE SPECIFIED
DO NOT SCALE DRAWING
DIMENSIONS ARE IN INCHES AND INCLUDE PLATING THICKNESS
ALL THREADS ARE UNIFIED NATIONAL #2B/3B, CLASS 2
REMOVE ALL BURRS AND SHARP EDGES

BASIC DIMENSIONS	2 PLACE DECIMALS	3 PLACE DECIMALS
UP TO 6	±.02	±.005
ABOVE 6 TO 24	±.03	±.010
ABOVE 24	±.06	±.015
ANGULAR DIMENSIONS 1/2°		

25S1G4
USED ON MODEL

DRAWN J.H.REED DATE 23 JUNE 98
CHKD J.H.REED DATE 28 JULY 98
MECH DATE
ELEC DATE

AMPLIFIER RESEARCH

ASSEMBLY DRAWING
REGULATOR CONTROL(25,100S1G4)
DWG. NO. 1009512
SCALE 2/1 SHEET 1 OF 1 REV —

BILL NO: 1009512-501 REV: - U/M: EA DRAWING NO: ARC-C\1009512
REG CTRL BD ASSY

SEQ	PART NUMBER	REV	D E S C R I P T I O N	U/M	QUANTITY-PER	DRAWING NUMBER	REF-DSGN
0010	1009511	-	SCHEM DIAG,REG CTRL BD	EA	REF	ARC-C\1009511	
0020	1009512	-	ASSY DWG,REG CTRL BD	EA	REF	ARC-C\1009512	
0400	27236		CAPR,FXD,DIP SPACED CER,.1UF,50VDC	EA	3.000	AVX\MD015C104MAA	C1 ,C8 C9
0410	27055		CAPR,TANT,6.8UF,50V	EA	6.000	MAL\TDC685K050NLF	C2 ,C3 C4 ,C5 C6 ,C7
0420	27068		CAPR,ELECT,100uF,50VDC,AXIAL	EA	2.000	ICI\107TTA050M	C10 ,C11
0700	1N4448		DIODE,SIGNAL,75V PIV	EA	6.000	FCH\1N4448	CR1 ,CR2 CR3 ,CR4 CR5 ,CR6
1500	41187		CONN,LOCKING HEADER,STR,20 PIN,.10 CNTRS	EA	2.000	PNT\MLSS100-20	J1 ,J2
1700	43040		RELAY,LO-PWR,DPDT,12VDC,360 OHMS,PIN L POS	EA	4.000	ARO/DS2EMDC12V	K1 ,K2 K3 ,K4
2500	2N3904		XSTR,SWNG,NPN,40V,0.2A,1W	EA	1.000		Q1
2510	2N3906		XSTR,SWNG,PNP,40V,0.2A,1W	EA	1.000	ARE\2N3906	Q2
2700	55612-8201J		RES,FXD,METAL FILM,8.2K,5%,1/4-1/2W	EA	2.000	TRW\GP55-8201+/-5%	R1 ,R21
2710	55612-1001J		RES,FXD,METAL FILM,1K,5%,1/4-1/2W	EA	1.000	TRW\GP55-1001+/-5%	R2
2720	55612-5601J		RES,FXD,METAL FILM,5.6K,5%,1/4-1/2W	EA	2.000	TRW\GP55-5601+/-5%	R3 ,R5
2730	55612-6201J	-	RES,FXD,METAL FILM,6.19K,1%,1/4W	EA	1.000	IRC\RN55D6191F	R4
2740	55612-2203J		RES,FXD,METAL FILM,220K,1%,1/4-1/2W	EA	2.000	TRW\GP55-2203+1-5%	R6 ,R14
2750	55612-1802J		RES,FXD,METAL FILM,18K,5%,1/4-1/2W	EA	2.000	TRW\GP55-1802+/-5%	R7 ,R16
2760	55612-2701J		RES,FXD,METAL FILM,2.7K,5%,1/4-1/2W	EA	2.000	TRW\GP55-2701+/-5%	R8 ,R17
2770	55612-2702J		RES,FXD,METAL FILM,27K,5%,1/4-1/2W	EA	2.000	TRW\GP55-2702+/-5%	R9 ,R11
2780	55612-2202J		RES,FXD,METAL FILM,22K,5%,1/4-1/2W	EA	2.000	TRW\GP55-2202+/-5%	R10 ,R12
2790	55612-1502J		RES,FXD,METAL FILM,15K,5%,1/4-1/2W	EA	1.000	TRW\GP55-1502+/-5%	R13
2800	55612-6801J		RES,FXD,METAL FILM,6.8K,5%,1/4-1/2W	EA	1.000	TRW\GP55-6801+/-5%	R15

BILL NO: 1009512-501 REV: - U/M: EA DRAWING NO: ARC-C\1009512
REG CTRL BD ASSY

SEQ	PART NUMBER	REV	D E S C R I P T I O N	U/M	QUANTITY-PER	DRAWING NUMBER	REF-DSGN
2810	55612-3901J		RES,FXD,METAL FILM,3.9K,5%,1/4-1/2W	EA	1.000	TRW\GP55-3901+/-5%	R18
2820	55612-1500J		RES,FXD,METAL FILM,150,5%,1/4-1/2W	EA	1.000	TRW\GP55-1501+/-5%	R19
2830	55612-1501J		RES,FXD,METAL FILM,1.5K,5%,1/4-1/2W	EA	1.000	TRW\GP55-1501+/-5%	R20
2840	55512-33R0J		RES,FXD,CARBON COMP,33,5%,1/4W	EA	1.000	A-B\CB3305	R22
2850	55612-3300J		RES,FXD,METAL FILM,330,5%,1/4-1/2W	EA	1.000	TRW/GP55-330 +/-1%	R23
3700	60046		INTEGRATED CKT,3 TERM,POS REG.	EA REF		MOT\MC7815CT	U1
3710	60066		IC,3 TERM,NEG REG	EA REF		MOT\MC7905CT	U3
3720	60009		INTEGRATED CKT,LINEAR,OP.AMP.	EA	1.000	RCA\CA3140AE	U4
3730	60064		IC,DUAL,COMPARATOR	EA	1.000	MOT\LM393AN	U5
3740	60048		INTEGRATED CKT,3 TERM,NEG REG.	EA REF		MOT\MC7915CT	U6
4500	73010		SOCKET,I.C.,8 PIN,DIP	EA	2.000	TII\C93-08-02	XU4 ,XU5
5000	1009513-101	-	PWB,REG CTRL	EA	1.000	ARC-B\1009513	1

SPARES:

QTY. REQD.	ITEM	PART NO.	DESCRIPTION
		PARTS LIST	

DRAWN	J.H.REED	
CHKD	J.H.REED	
MECH	J.MAGENN	
ELEC	J.BANCROFT	

CONTROL LOADED ON MODEL

ENSTRUMENTATION RESEARCH

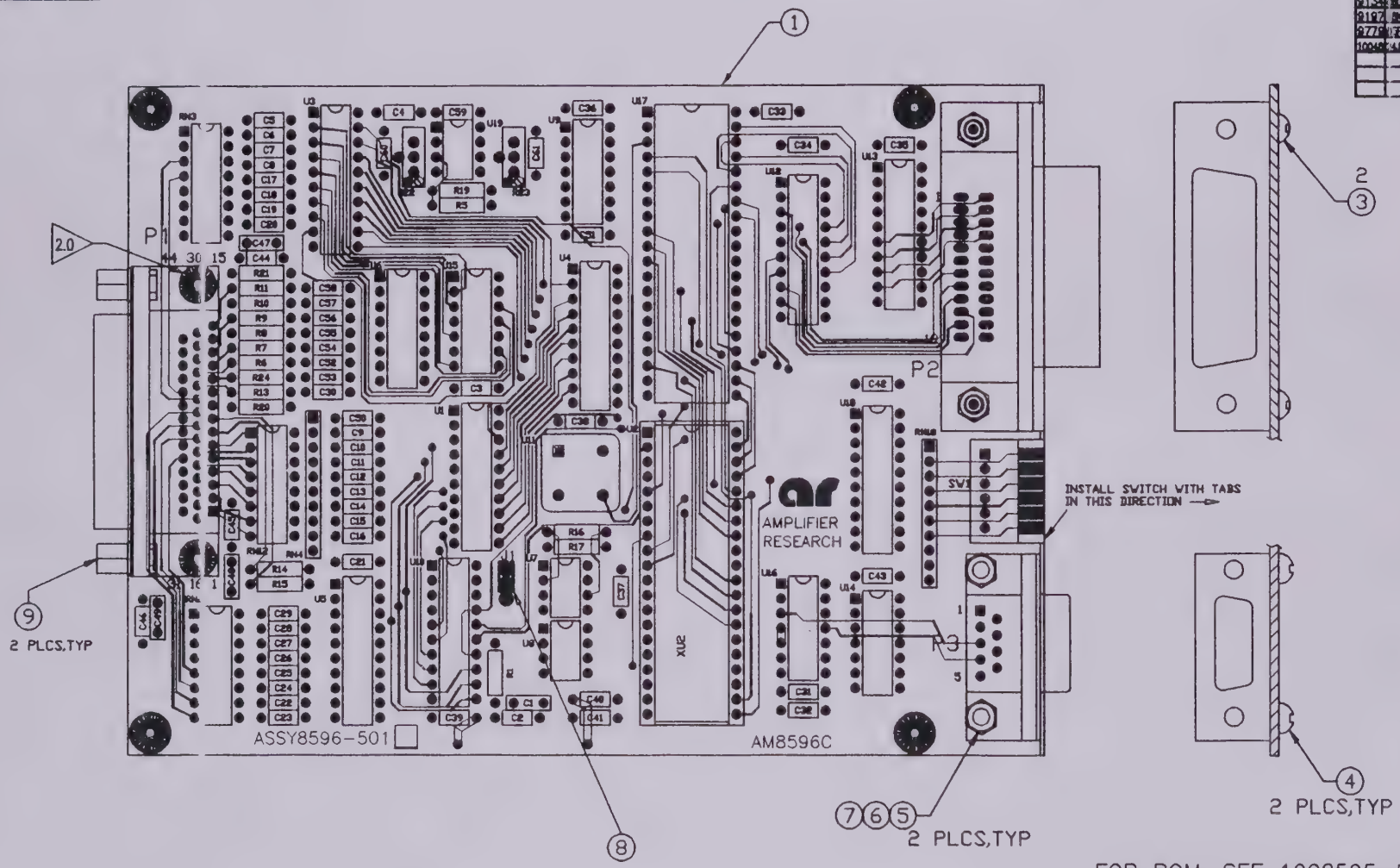
SCHEMATIC

OPERATE/CONTROL BD(OCB)

DWG. NO. 1008597

SCALE 1/1 SHEET 1 OF 1 REV B

REV	DESCRIPTION	BY



FOR BOM, SEE 1008595-501

NOTES:

1.0 USE SOCKET ONLY ON U2.

2.0 MOUNTING TABS, SOLDER 2 PLACES.

3.0 THIS IS A MULTI-LAYER BOARD, USE CARE IN INSTALLING OR REMOVING COMPONENTS.

4.0 SOLDER FROM FAR SIDE ONLY, USING MINIMUM HEAT.

ITEM	QTY. REQD.	PART NO.	DESCRIPTION	MARK	FIN	MATL
		PARTS LIST				

DRAWN J.H.REED DATE 14 FEB 97
CHKD J.H.REED DATE 17 JUN 97
MECH J.MAGINN DATE 20 AUG 97
ELEC F.SCHIRK DATE 21 AUG 97

AMPLIFIER RESEARCH

ASSEMBLY DRAWING
OPERATE/CONTROL(OCB)

DWG. NO. 1008595

SCALE 2 : 1 SHEET 1 OF 1 REV. D

50S1C4 USED ON MODEL

BILL NO: 1008595-501 REV: C U/M: EA DRAWING NO: ARC-C\1008595
PWB ASSY,OPERATE/CONTROL(OCB)

SEQ	PART NUMBER	REV	D E S C R I P T I O N	U/M	QUANTITY-PER	DRAWING NUMBER	REF-DSGN
0010	1008597	B	SCHEM DIAG,OPERATE/CONTROL(OCB)	EA	REF	ARC-D\1008597	
0020	1008595	D	ASSY DWG,OPERATE/CONTROL(OCB)	EA	REF	ARC-C\1008595	
0400	27229		CAPR,CER,2.2uF,50V	EA	4.000	\RPE210Z5U225Z050V	C1 ,C47 C48 ,C49
0410	27236		CAPR,FXD,DIP SPACED CER,.1UF,50VDC	EA	22.000	AVX\MD015C104MAA	C2 ,C3 C4 ,C9 C10 ,C11 C21 ,C31 C32 ,C33 C34 ,C35 C36 ,C37 C38 ,C39 C40 ,C41 C42 ,C43 C50 ,C51
0420	27263		CAPR,FXD,DIP SPACED CER,.01uF,100V	EA	35.000	AVX\MD011C103KAB	C5 ,C6 C7 ,C8 C12 ,C13 C14 ,C15 C16 ,C17 C18 ,C19 C20 ,C22 C23 ,C24 C25 ,C26 C27 ,C28 C29 ,C30 C44 ,C45 C46 ,C52 C53 ,C54 C55 ,C56 C57 ,C58 C59 ,C60 C61
1500	41310		CONN,LOCKING HEADER,STR,3 PIN,.10 CTRS	EA	1.000	MOL\22-10-2031	J1
2200	41234		CONN,RECEPT,44 CKT,R.A. PC MOUNT	EA	1.000	AMP\748482-5	P1
2210	41241		CONN,RECEPT,24PIN	EA	1.000	AMP\553811-1	P2
2220	41242		CONN,RECEPT,9 PIN	EA	1.000	AMP\745781-4	P3
2700	55612-10R0F		RES,FXD,FILM,10 OHM	EA	7.000	\RN55D10R0F	R1 ,R6 R7 ,R8

BILL NO: 1008595-501 REV: C U/M: EA DRAWING NO: ARC-C\1008595
PWB ASSY,OPERATE/CONTROL(OCB)

SEQ	PART NUMBER	REV	D E S C R I P T I O N	U/M	QUANTITY-PER	DRAWING NUMBER	REF-DSGN
							R9 ,R13 R24
2710	55612-1002F		RES,FXD,PRECISION,10K,1%,1/4-1/2W,CHAR.D	EA	6.000	MFG\RN55D1002F	R5 ,R16 R17 ,R19 R20 ,R21
2720	55612-1001F		RES,FXD,PRECISION,1K,1%,1/4-1/2W,CHAR.D	EA	2.000	MFG\RN55D1001F	R10 ,R11
2730	55612-1000F		RES,FXD 100 OHM1/4W,1%	EA	2.000	MFG\RN55D1000F	R14 ,R15
2740	55920		RES,VAR,CERMET,MULTITURN,TOP ADJ,20K,10%,1/2W	EA	2.000	BOR\3299Y-1-203	R22 ,R23
2750	55946		RES,16PIN DIP,1K	EA	3.000	BOR\4116R-001-102	RN2 ,RN3 RN12
2760	55943		RES,10 PIN SIP,100K,100MW	EA	2.000	CTS\770-101-R-100K	RN4 ,RN18
3100	57088		SWITCH,DIP ROCKER,6 POS	EA	1.000	GRY/76PSB06	SW1
3700	60087		I.C.,INVERTING BUFFER	EA	3.000	NSI\MM74HC541N	U1 ,U3 U18
3720	60088		I.C.FLIP-FLOP	EA	2.000	NSI\MM74HCD574N	U4 ,U5
3730	60093		I.C.DARLINGTON DRIVER	EA	1.000	NSI\DS2003CN	U6
3740	60096		I.C.OP AMP	EA	2.000	NSI\LF351N	U7 ,U8
3750	60091		I.C.HEX INVERTER	EA	1.000	NSI\DM74LS04N	U9
3760	60090		I.C.CMOS DAC	EA	1.000	AND\AD7248AAN	U10
3770	25062		OSC,CLOCK 20MHZ	EA	1.000	CTS\MXO45HS	U11
3780	60123		IC,TRANSCEIVER,8 CHANNEL	EA	1.000	TII\SN75161BN	U12
3790	60097		I.C.TRANSCEIVER	EA	1.000	NSI\DS75160AN	U13
3800	60094		I.C.RECEIVER,CMOS	EA	1.000	MAX\MAX1489ECPD	U14
3810	60089		I.C.DIODE ARRAY	EA	1.000	MOT\MAD1103P	U15
3820	60095		I.C.CMOS LINE DRIVER	EA	1.000	MAX\MAX1488ECPD	U16
3830	60086		I.C.NEC MPD7210 REPLACEMENT	EA	1.000	NSI\NAT7210APD	U17
3840	60013		INTEGRATED CKT,LINEAR,DUAL,OP.AMP.	EA	1.000	RCA\CA3240AE	U19

BILL NO: 1008595-501 REV: C U/M: EA DRAWING NO: ARC-C\1008595
PWB ASSY,OPERATE/CONTROL(OCB)

SEQ	PART NUMBER	REV	D E S C R I P T I O N	U/M	QUANTITY-PER	DRAWING NUMBER	REF-DSGN
4510	73031		SOCKET,IC,40PIN	EA	1.000	TII\C93-40-02	XU2
5000	1008596-101	C	PWB,OPERATE/CONTROL(OCB)	EA	1.000	ARC-C\1008596	1
7100	11032		SCREW,MACH,PAN HD,CROSS-REC,S/ZN,4-40X.38,TYPE SW	EA	A/R		3
7110	11011		SCREW,MACH,PAN HD,CROSS-REC,S/S,4-40 X .38	EA	A/R	\MS51957-15	4
7500	12010		WASH,FLAT,S/S,#4,.250 OD X .125 ID X .022 THK	EA	A/R	\MS15795-803	5
7510	12047		WASH,LOCK,SPLIT,S/S,#4	EA	A/R	\MS35338-135	6
7520	13003		NUT,HEX,S/S,4-40,.187AF	EA	A/R		7
7530	53025		SHUNT,2 PIN	EA	1.000	D-K\929955-06-ND	8
7540	69262		SCREWLOCK KIT,F,USE WITH METAL SHELL"D"CONN	EA	1.000	AMP\207952-1	9

SECTION VI

RECOMMENDED SPARE PARTS

6.1 LEVEL OF MAINTENANCE

Three separate lists of parts are recommended for maintenance of the related amplifier. Each list will contain parts that will be required for repairs to be performed at a particular level of technical expertise and equipment needed to perform this level of maintenance. The three levels of maintenance are as follows.

Level 1—Technician Level

Performed at equipment location with connectorized items. Limited to replacement of printed wiring boards (PWBs), amplifier assemblies, fuses, and so forth. Requires qualified technical personnel. Suggested when down time must be minimized.

Level 2—Field Service/Shop Level

Parts replacement requiring minimum adjustment or alignment. Includes PWB repair, and replacement of controls, power supply components, fans, and individual Radio Frequency (RF) components that would not adversely affect the amplifier's alignment.

Level 3—Factory-Authorized Level

Repairs that require amplifier alignment or major adjustments. To be performed by a qualified technical staff in a properly instrumented laboratory.

BILL NO: 1009507-501 REV: C U/M: EA DRAWING NO: ARC-D\1009507
MODEL 25S1G4A,25 WATTS,800MHz-4.2GHz

ITM	PART NUMBER AND DESCRIPTION	DRAWING NUMBER	REV	U/M	SCRAP PCTG	MRP	MANF CLASS	QUANTITY-PER	SPARE-QTY	LEVEL	REFERENCE DESIGNATORS

* * * END OF REPORT C0606 - 10:26:05 13 SEP 2000 * * *

AMPLIFIER RESEARCH

MODEL NO. 25S1G4A
SERIAL NO. 28945
TESTED BY CJM
DATE 9/22/00

TEST DATA SHEET

FREQ. (GHz)	POWER OUTPUT @ 1dB COMPRESSION (WATTS)	POWER OUTPUT SATURATED (WATTS) @ 0dBm INPUT	HARMONIC DISTORTION @ 20 WATTS dbc
0.8	32.6	34.7	26
1.0	38.0	38.2	30
1.25	41.7	43.6	31
1.5	38.4	37.0	31
1.75	32.2	36.7	34
2.0	26.3	33.7	34
2.25	31.9	37.7	31
2.5	37.3	39.5	50
2.75	26.1	29.7	41
3.0	24.5	28.7	41
3.25	31.4	34.4	33
3.5	29.2	33.1	42
3.75	28.9	31.2	40
4.0	35.4	37.5	45
4.2	27.4	31.1	54

MINIMUM GAIN 50.1 dB @ 1.0 WATTS OUTPUT (at 2GHz)

FLATNESS ± 1.6 dB

OPEN TEST √ (√)

SHORT TEST √ (√)

STABILITY √ (√)

SPURIOUS √ (√)

INPUT VSWR 2:1 max

INPUT ATTEN. RANGE √ (√)

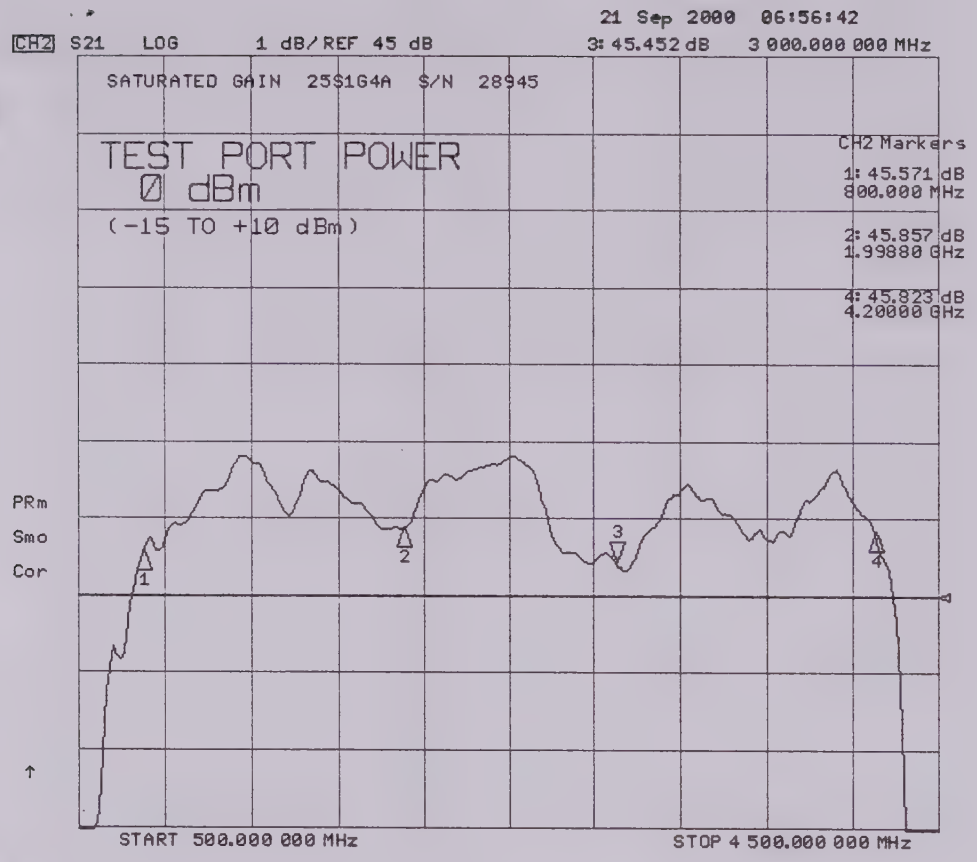
3RD ORDER INTERMOD √ (√)

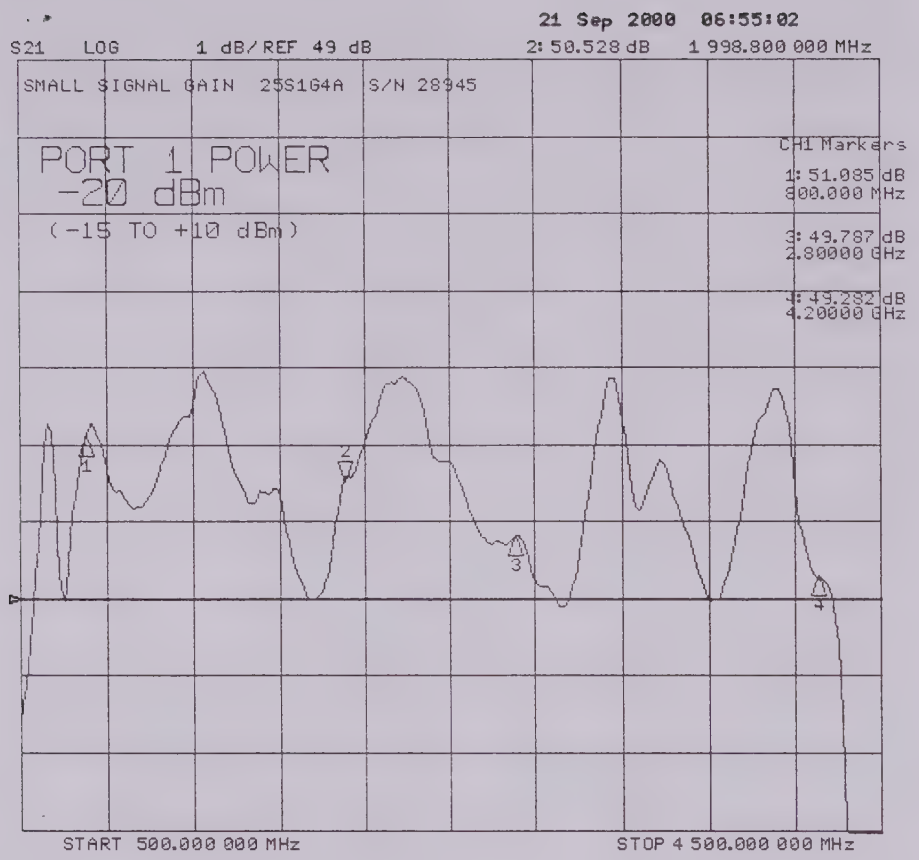
LINE VOLTAGE PERFORMANCE √ (√)

REMOTE IEEE-488/RS-232 √ (√)

TEST EQUIPMENT		S/N
SIGNAL GENERATOR		TEC-SG N/A
SWEEP GENERATOR		TEC-SW 1804
POWER METER		TEC-PM 1108
SPECTRUM ANALYZER		TEC-SA 1756
OSCILLOSCOPE		TEC-OS N/A
FIXED ATTEN.	40 dB	TEC-AT 1806
FIXED ATTEN.	6 dB	TEC-AT 1816

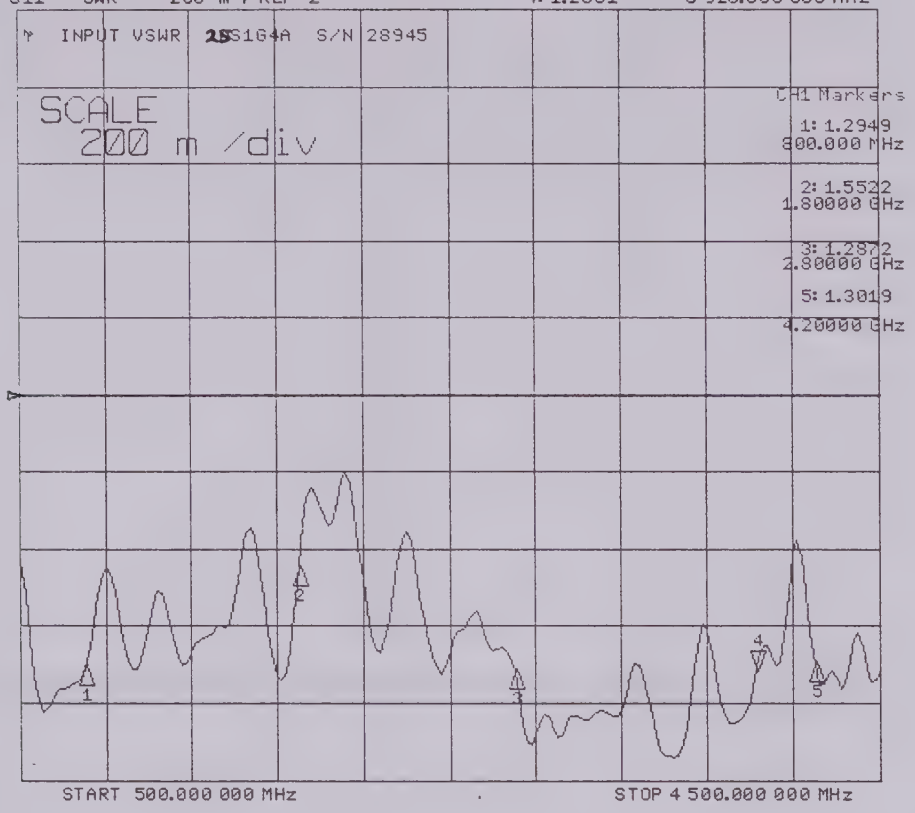
TEST EQUIPMENT CALIBRATION TRACEABLE TO
NATIONAL INSTITUTE OF STANDARDS & TECHNOLOGY. (NIST)


21 Sep 2000 06:56:42
CH2 S21 LOG 1 dB/ REF 45 dB
3: 45.452 dB 3 000.000 000 MHz
SATURATED GAIN 25S1G4A S/N 28945
TEST PORT POWER
0 dBm
(-15 TO +10 dBm)
CH2 Markers
1: 45.571 dB
800.000 MHz
2: 45.857 dB
1.99880 GHz
4: 45.823 dB
4.20000 GHz
PRm
Smo
Cor
START 500.000 000 MHz
STOP 4 500.000 000 MHz


21 Sep 2000 06:55:02
CH1 S21 LOG 1 dB/ REF 49 dB
2: 50.528 dB 1 998.800 000 MHz
SMALL SIGNAL GAIN 25S1G4A S/N 28945
PORT 1 POWER
-20 dBm
(-15 TO +10 dBm)
CH1 Markers
1: 51.085 dB
800.000 MHz
3: 49.787 dB
2.80000 GHz
4: 49.282 dB
4.20000 GHz
START 500.000 000 MHz
STOP 4 500.000 000 MHz

21 Sep 2000 06:50:12

CH1 S11 SWR 200 m / REF 2 4: 1.2861 3 928.000 003 MHz



AMPLIFIER RESEARCH
In compliance to IEC 1010-1
Safety requirements of electrical equipment for laboratory use
Annex K

ROUTINE TESTS

Model : 25S1G4A

Serial No. : 28945

Date : 9/22/00

Inspected By : CJM

ests: For equipment with working voltage up to 300 V

Protective earth resistance	Limit	
Apply 25 amps between protective terminal and **ACCESSIBLE** parts. Record resistance.	≤ 0.1 ohms	0.05 ohms

Mains circuit insulation	(Circle one)	(√)
Apply voltage from the mains input to chassis for a period of time greater than two (2) seconds. No arcing or breakdown should occur.	1350 VAC (1900 VDC)	✓

Floating input terminals	Record Voltage	(√)
Apply 1.5 times working voltage to floating input terminals, where applicable. No arcing or breakdown should occur.	N/A	N/A

CJM

WARRANTIES: LIMITATION OF LIABILITY

SEP 22 2000

Seller warrants (i) that seller has title to the goods sold and (ii) that Amplifiers, Antennas, Test Cells, Directional Couplers and Tripods will be free from defects in material and workmanship for a period of three (3) years from date of shipment shown on Amplifier Research invoice. Field Monitoring Equipment and Interference Generators will be free from defects in material and workmanship for a period of two (2) years from date of shipment. Vacuum tubes, traveling-wave tubes and other products will be free from defects in material and workmanship for a period of one (1) year. Seller's sole responsibility in fulfilling these warranties shall be to repair or replace any goods which do not conform to the foregoing warranties or, at seller's option, to give buyer credit for defective goods. The warranty is valid only when used in the country specified at time of order. Warranty service must be obtained from the repair facility designated at that time. If warranty service is not available in the country where the equipment is to be used then it must be returned to Amplifier Research. Warranty service will be provided only for defective goods which are returned within the warranty period, freight costs prepaid to Amplifier Research or its designated repair facility.

There are no other warranties, express or implied, including any warranty of merchantability or fitness. Seller shall not be responsible for any incidental or consequential damages arising from any breach of warranty.

No person other than an officer of Amplifier Research Corporation, has any authority to bind seller to any affirmation, representation or warranty except as specifically included in the preceding terms and conditions.

SEP 22 2000

www.manualsplus.com
1015393